

# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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## NEWS IN BRIEF

### 2,722 Tried, 852 Pass 1973 CDP Examination

PARK RIDGE, Ill. — A total of 852 candidates passed the 1973 examination for the Certificate in Data Processing (CDP). The 852 who passed all five sections of the exam represented approximately 31% of the 2,722 who sat for the exam last February, according to the Certification Council of the Data Processing Management Association.

The new CDP holders join the nearly 14,000 who have passed the examination since it was first given in 1962.

### Scorecard Here! You Can't Tell by the Code Numbers

PITTSBURGH — Well, they won't substitute code numbers for candidates' names again in two suburbs here after last month's fiasco.

The Systems and Computer Services Bureau and the Elections Bureau had promised returns on all May 15 primary borough and township elections and suburban school district races by between 5 a.m. and 6 a.m. of the next day, but the actual delivery was far afield.

The computer was programmed to spew out code numbers instead of candidates' names along with the corresponding vote totals, but by the time the code numbers were converted to names, duplicating machinery was insufficient to produce the final tallies in the projected time frame.

The duplicators took until 2:30 p.m. (May 16) to give the Democratic returns for each suburb and were still working on the Republicans late that night.

## SPECIAL REPORT

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## System Analysis From Scratch

By Michael Weinstein  
Of the CW Staff

AKRON, Ohio — "When top management asked me to perform a computer system analysis, it was obvious they did not want me to return with flip charts and discuss disk data set contention, operating system optimization and channel loads," stated D.E. Brotherton, technical adviser for management information systems at General Tire and Rubber (GT&R).

For management to understand his project, Brotherton said he had to revise some basic and commonly held definitions about system efficiency.

Management tended to look at the computer in the same light as any other manufacturing equipment. It wanted to know how much work the system could perform and how much work it was presently performing.

An added advantage of any analysis would be to develop techniques to measure how the work potential could be changed by adding new features such as peripherals or more

operating staff, Brotherton said.

Discarding classical system analysis approaches, Brotherton decided to build an analysis method from scratch that would answer these questions.

### Basic Definition

His basic definition was that system capacity is the capability of a given computer configuration with operators and operating system (excluding card equipment) to produce visible work expressed in units of production per unit of time.

Put another way, system capacity at GT&R is the amount of jobs the system could perform per unit of time.

A second definition was that computer system utilization equals the ratio of the actual use of available computer system capacity to the total computer system capacity — expressed as a percentage.

And finally, computer system efficiency is the ratio of a

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## Justice Demands Daily Fines for IBM If IBM Papers Not Released by June 29

By E. Drake Lundell Jr.  
Of the CW Staff

NEW YORK — In one of its strongest moves to date, the Justice Department last week asked Judge David Edelstein to impose stiff civil and criminal penalties against IBM if it continues to refuse to turn over documents to the government for its antitrust action.

"I am not required by law to deliver the documents to the government and shouldn't do so." — Bruce Bromley, IBM attorney

If IBM continues to refuse to release the documents, Justice said, it should be re-

quired to pay 5% of its net daily earnings in penalties and a stiff criminal contempt fine.

### June 29 Deadline

In the government request, IBM should be required to deliver the documents to the government by June 29 or be found in contempt and required to pay a fine from that date forward for each day it fails to deliver them.

The fines, if they are levied, would be paid directly into the U.S. Treasury for the time that IBM is in contempt, the Justice Department said.

The criminal contempt citation could cost the company \$1 million, if Justice is successful, and the civil penalties could amount to around \$175,000/day for every day that IBM refuses to turn over the documents, sources estimated.

At contest are 1,200 documents that IBM turned over to Control Data in their antitrust action, but which IBM has so far refused to give to the government for its case, claiming they were handed over to Control Data "inadvertently."

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## DPMA Seeks Stronger Bond Between Members, Public

By Patrick Ward  
Of the CW Staff

PARK RIDGE, Ill. — The Data Processing Management Association has zeroed in on 11 topics of concern for the data processing community and has urged its members to "assume their responsibilities to help resolve them."

Along with predictions of establishing a lobby in Washington in the next year, DPMA released to its members a *Guidelines for Government and Public Liaison* report to help them get more involved in

The Data Processing Management Association will hold its annual conference this week at the Conrad Hilton Hotel in Chicago.

representing their profession and sharing their expertise in government, schools and their communities.

The 11 issues mentioned in the report are:

- Conversion to the metric system and the related ramifications affecting the computer community.
- Computer-implemented voter registration.
- Computer abuse of personal or private information.
- Bureau of Standards recommended standards for the information processing community.
- Computer services offered by banking institutions.
- The government's use and expansion

of data banks.

- The value and recognition of the RBPE and CDP designations.
- Shared time processing — government and industry.
- Selection procedures for equipment.
- Standard performance requirements with respect to staff and equipment.
- Data acquisition, security and ac-

(Continued on Page 4)

### Bride Named Editor

## Herbert Grosch Appointed CW's Editorial Chief

NEWTON, Mass. — Dr. Herbert R.J. Grosch will join *Computerworld* July 2 in the new position of editorial director.

Already effective is the promotion of Edward J. Bride to the post of editor.

In making the announcement, CW publisher Patrick J. McGovern explained that Grosch will be responsible for overall policy and direction of the CW editorial department, including general guidance for the editorial page.

Bride will implement the ideas of the editorial director, check out trends in the



Grosch

user community and the computer industry and administer the operation of the editorial department.

Grosch's activities in the computer arena go back three decades, to the University of Michigan where he received his

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**EDITORIAL OFFICES:** 797 Washington St., Newton, Mass. 02160. Phone: (617) 332-5606. Telex: 92-2529. **Washington:** Room 1129, National Press Bldg., Washington, D.C. 20004. Phone: (202) 638-0901. Telex: 89-544. **Los Angeles:** 963 N. Edgecliffe Drive, Los Angeles, Calif. 90026. Phone: (213) 665-6008. **Europe:** Computerworld, c/o IDC Europa Ltd., 59 Grays Inn Rd., London, W.C.1, England. Phone: 01-242-8908. **Asia:** Computerworld, c/o Shukan Computer, Dempa Building, 1-11-15, Higashi Gotanda, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: 26792.

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# Human Language Used as Source Code

 By Don Leavitt  
 Of the CW Staff

NEWTON, Mass. — Ordinary English — without any of the excess baggage of programming languages — has been successfully used as the source code for various business-type applications in a Navy-funded research project being conducted here.

The Genie project includes a two-stage translator which converts the human language input into a programming language — Basic or Snobol, thus far — before compiling and executing the program. It is successful, the researchers feel, because the translation problem has been attacked with several methods.

The work is being done by Edmund C. Berkeley, one of the founders of the Association for Computing Machinery, and two local high school seniors, Andy Langer and Casper Otten.

"The reason for our breakthrough," Berkeley said, "is that we have been using a number of principles all together, rather than trying to apply just one. We have applied mathematical, linguistic, grammatical and cryptographic techniques seasoned, when all else failed, with common sense."

The result, he added, is that Genie has been able to consider its input from the point of view of the human who wrote it in the first place.

Genie's input comes in three parts. An orderly list of instructions, much as a manager would provide a new clerk, is supplemented by a worked example of what the manager/programmer wants done. A Calculation layout form defines

the contents of each column and total to be included on a printout.

Genie's logic is flexible enough, the researchers said, to "understand" the context of words in the original instructions and to apply the appropriate synonym, from a stored dictionary, to standardize the terminology as a first step toward converting it into a highly structured programming language.

The translator is able to distinguish, for example, between "total" used as a noun and as a verb. It also can recognize that various terms — "total," "add" and "sum" — may all logically refer to the

same operation.

Dependence on a synonym dictionary appears to rule out generalized use of a single Genie system for all application areas. But development of special dictionaries might make the Genie logic available to many users who prefer working in languages appropriate to their interests, rather than in a conventional programming language.

A report on the current status of the Genie project, with examples and discussions of its limitations, is in the June issue of *Computers and Automation*, published here by Berkeley Enterprises, Inc.

## Societies' Place on Codasyl a ?

Special to Computerworld

SYRACUSE, N.Y. — The executive committee of the Conference on Data Systems Languages has apparently moved to expel most data processing societies from the conference, according to several reports.

Hamilton Armstrong, president of the Society of Professional Data Processors, said that Warren Simmons, executive secretary of Codasyl, has refused his society's application for a seat on the Codasyl Planning Committee on the grounds that "the committee has now been disbanded."

Armstrong said this would mean the removal — without apparent appeal — of many representatives of the societies and user groups from Codasyl.

It was, he commented, particularly unfortunate since the Planning Committee

in an authorized publication, the *Codasyl Newsletter*, had specifically invited increased participation in the affairs of the conference by professional societies and user groups through Planning Committee membership.

The Codasyl Planning Committee, under the Codasyl Constitution, must provide input for the other committees of the conference, in particular for the Programming Languages Committee. The Programming Languages Committee determines the changes in the Cobol language.

The lack of activity of the Planning Committee has come under recent fire both from members of the committee itself and from the Programming Languages Committee which complained last year that the Planning Committee had been asked to supply detail as to the use of the report writer, and had failed

## Grosch Named CW Editorial Chief

(Continued from Page 1)

doctorate in astronomy in 1942.

He worked for IBM, MIT and GE before joining the government in 1967 as director of the Center for Computer Science and Technology at the National Bureau of Standards (NBS).

### Active in Space Program

He has been active in the nation's space program, having helped secure a pioneering facilities contract for GE to operate the Nasa computing facility at Huntsville, Ala.

He also operated the IBM-Nasa computing center before being named manager of the IBM space program in the early sixties.

Most recently he was senior research fellow at the NBS facility, a post he resigned to join CW. He is also a fellow of the British Computer Society.

Grosch is a charter member of the Association for Computing Machinery and a founder of Share, the IBM user group.

He has spoken to technical and general

audiences in 17 countries and in 44 states and provinces.

He is also well-known as the author of Grosch's Law: computer economy is as the square root of the speed (or, as he now phrases it, "to do it 10 times as cheaply, you must do it 100 times as fast").

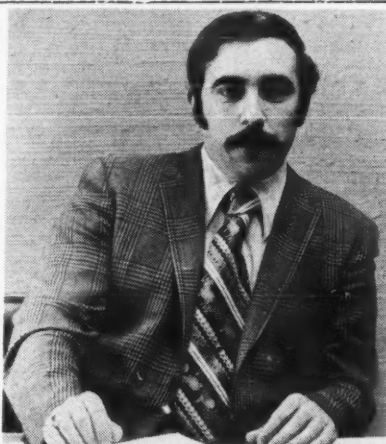
This law has become widely used as a pricing tool in the computer industry, McGovern commented.

### 'Adventures Ahead'

Grosch apparently does not believe that computer technology has leveled-off; he commented that there are "adventures ahead in information technology and its applications that will make what we have today look like Napier's Bones."

The big challenges, though, are "human: to be imaginative, to be honest, to be compassionate," he added.

Bride has been with *Computerworld* for four of its six years in existence. He has served as editor of the Societies/User Group section and the Small Systems



CW Photo by Leslie Flanagan

**Bride**

User page, as well as general news editor.

He is the forum manager of CW's Computer Caravan, and has spoken before professional societies on such subjects as computer security and the role of the press in the computer community.

He also coauthored a new management textbook, *Computer Use: An Executive's Guide*, published last month by Allyn & Bacon [CW, June 20].

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## Plan for Handicapped

# Teachers Fight Data Bank

By Toni Wiseman  
Of the CW Staff

ANNAPOLIS, Md. — With all the talk about a "Big Brother" society, invasion of privacy and protection of confidential information, things looked pretty grim when the Maryland State Department of Education decided to create a data bank on handicapped children.

The issue intensified when the Prince George's County Educators' Association voted to oppose the bank, with teachers refusing to fill out the necessary data sheets.

Robert Danks, director of the Data System for the Handicapped (DSH), claimed that teachers opposed the system because of a lack of information on how it works and why it was being set up.

The teachers also objected to having to make what were termed "medical decisions," which they felt they were unqualified to make.

"This is an inaccurate view," said Danks. "The entire project is an 'after-the-fact' type of thing. It isn't an invasion of privacy because the information is already on file with an agency. They are merely being asked to copy the information from the child's file — information provided by a qualified medical doctor or psychologist."

Six agencies are cooperating in the DSH venture in an attempt to secure the information each of them needs to function in an optimal manner. The agencies include the departments of education, juvenile services, mental health, public health, social services and mental retardation.

The question of privacy, access and protection is easily solved, Danks said. DSH is using the state's computer which will be the central storage place for all data.

"However," Danks said, "the only people who will be able to access that data are the officials for the specific agency. Each agency controls its own information. There is no sharing of information other than statistical summaries and frequency tabulations."

As a safety control, each agency's data is stored separately on disk packs so that essentially there are six separate computer systems.

## Watershed Modeling Keeps Big Blue Big

LINCOLN, Neb. — Scientists have turned to computer modeling to manage the water supply of the Big Blue River Basin in southeast Nebraska, a mixture of grassy plains and rolling hills supporting half a million acres of irrigated cropland.

With extremely variable precipitation from year to year, resulting in an erratic water supply as well as varying groundwater levels and water tables, the basin's problem was too complex for pencil and paper alone.

The watershed modeling program was started in July 1971 by the state's Water and Resources Research Institute and the Conservation and Survey Division, using University of Nebraska personnel.

All of the physical data concerning the basin is converted into math terms and used by the computer to predict development trends, according to Warren Veissman Jr., director of the research institute.

"With the aid of the computer model, it is possible to tell what will happen in 10 or 20 years to the water supply if different management techniques are applied, all before committing resources to a specific program," Veissman said.

"It may be that, no matter what, the groundwater is going to be lost eventually. In that case, the computer could help determine ways to prolong the supply until the community can shift to a different economy."

"The child's name is on the form when we receive it," Danks explained, "but when we process the file, we create a Soundex code number for it, a non-returnable code, and this goes into the computer. It is simply to identify records one from the other and to avoid duplication." All DSH forms and IBM cards keypunched from the forms are destroyed after the number has been assigned, Danks added.

Also, during processing a one-time list matching name and Soundex number is developed for an agency. This allows the agency to update or change any record it chooses.

The state, Danks emphasized, cannot access information on a specific individual. It looks at the system only in terms of the entire state's population, he said. Each agency has veto power over its data, and it alone can correlate data with names.

## Forms Industry Faces Shortages

By a CW Staff Writer

COLORADO SPRINGS, Colo. — The business forms industry will face a severe shortage of printing and carbon papers over the next few years, according to industry sources.

The problem is not a lumber shortage, but can be traced to financial difficulties caused by a 1972 tariff increase of 350% on Canadian supplies, which cut off many sources, according to a study by Arthur D. Little, Inc. (ADL).

The costs of new U.S. pollution control requirements will also impact the prices and legislation has already closed a number of paper mills. The average price from the April 1, 1973, level to the end of 1974 is expected to increase 18% to 25% for printing paper, and between 30% to 50% for the one-time carbons, according to the study.

Other causes of the shortage, the study noted, are depressed product prices, heavy corporate debt burdens,

a continuing increased demand for higher profitability items such as box-boards and toilet paper, thus discouraging the paper-makers from producing computer paper, and financial pressures which have halted new mill construction.

Of the 16 plants currently being built, according to Beldon Menkus, a consultant in New Jersey, only 6% of the production capacity is intended for computer printouts.

The business forms industry's paper consumption is expected to increase by at least 50% in five years from its 1972 level, according to Anthony S. Niskanen of ADL. The ADL study indicated, however, that the paper industry will be unable to add any significant new capacity until late 1976.

The paper industry has noted that the shortage particularly applies to the area of under 16-lb paper, which takes in most computer paper, but does not affect newsprint and the high quality rag papers.

# Ampex gives you more than you asked for...again

**Ampex' newest space saver...the 3420-compatible two-in-one tape subsystem for 360 and 370 computers**

The biggest news since Ampex pioneered tape recording is the new two-in-one configuration for the Ampex TC-38/TM-34 tape subsystem. Now you can reduce the amount of space for tape drives and controllers in your DP center by nearly 50% ... or double the number of drives without allocating more space. You can get two high performance 3420-compatible tape drives with data rates to 200 KB, in a single cabinet only a little larger than one individually mounted tape drive. It's such a logical idea, it's amazing no one thought of it before.

But space reduction is only the beginning. The autothread on the TM-34 now is equipped with an exclusive "halo of air" that vastly improves threading without the reel-surround cartridge. The tape will literally thread itself from any position. Furthermore, the TM-34 has an automatic reel latch that forever eliminates manually operated locking levers or buttons. And, of course, this drive has a radial interface for operation with either the Ampex TC-38 or the IBM 3803 controller.

Format configurations include any combination of 9-track, single or dual density, and 7-track with data rates from 60 to 200 KB.

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# Judge Holds Off on Final Judgment in Telex-IBM Case

By E. Drake Lundell Jr.  
Of the CW Staff

TULSA, Okla. — Due to the complexities of the case and the need for further study of the documents, Judge A. Sherman Christensen last week decided not to issue a temporary opinion in the \$1.2 billion antitrust case brought by Telex against IBM.

Christensen also indicated he had decided not to issue a tentative decision at the close of final arguments in order to prevent any insider trading in the stock of either company by the courtroom attendees.

However, Christensen indicated he would reach his final opinion fairly soon — possibly within 30 to 60 days — because he wanted to rule while all of the evidence was fresh in his mind.

In the concluding argument before the judge, Floyd Walker, Telex attorney, claimed Telex not only wanted the monetary damages allowed under the Sherman Antitrust Act, but also wanted the judge to issue injunctions against IBM that would prohibit what it considered to be predatory practices.

"The ability of IBM to destroy the (plug-compatible manufacturers) must be denied them," Walker said, indicating the court had the jurisdiction "and power to create a competitive situation in the marketplace."

He asked first for an injunction that would prohibit IBM from offering long-term leases such as the fixed- and extended-term plans and that would free users from the penalties associated with such leases now in effect.

In addition, he asked the court to issue an injunction that would require IBM to

release interface specifications for all new products at the time that they were introduced and marketed.

Walker also contended that IBM should be required to reveal all of its product improvement plans when it introduced a product so that situations, such as with the 370/155, could be avoided, and so that competitors would know of the changes that were planned in various products over their lifetime.

For the defense, IBM attorneys indicated the DP market was extremely competitive, growing from just 13 firms in 1952 to over 1,700 in 1970.

## U.S. Demands Daily Fines for IBM

(Continued from Page 1)

IBM claims the documents are privileged because of the lawyer-client relationship and that they were prepared by a member of the IBM legal team.

However, outside sources have indicated the documents consist largely of memoranda prepared by IBM executive Hillary Faw, who had worked directly for Thomas J. Watson Jr. but who recently was switched to the staff of IBM counsel Nicholas Katzenbach.

Some sources have even indicated the reason for the switch was to allow IBM to claim the Faw memos were privileged when they were found to be damaging to the IBM antitrust cause.

IBM has been fighting the release of the documents ever since Edelstein ordered them produced last September.

IBM's appeal to the Federal Appellate Court here was unsuccessful and a motion

In addition, they argued that the plug-compatible distinction is a "meaningless and artificial" way to study the market and that the judge should consider the entire market for products and services in deciding on the relevant market and the share held by IBM.

The Telex-proposed market definition does not make any sense, IBM lead attorney Thomas Barr stressed.

IBM produced its product not to compete just with the independent peripherals companies as claimed by Telex, but also to compete with other systems makers and leasing companies, so that the

made by IBM to the Supreme Court to stay the execution of the Edelstein order was unsuccessful on June 13 of this year, when that court in a 5 to 1 decision turned down the IBM request.

### Request in Limbo

However, the Supreme Court ruling, in which three justices excused themselves from the hearing, did not hear the merits of the case and the court has not decided yet whether to take it up next year. All it did was strike down an IBM request that the order be delayed until the Supreme Court decided whether to hear the case.

At the same time the Justice Department demanded that IBM be found in contempt and fined, IBM attorneys also agreed the company should be found in contempt, in order to get the issue of the documents and Edelstein's ruling fully aired before an appellate court.

Telex claim was false.

Barr also claimed that Telex was not damaged by any IBM actions and that its problems resulted solely from management weaknesses and mistakes, not IBM competition.

Barr further contended that Telex was presently in a good position and that it was growing fast.

IBM has been successful in this market solely because of "skill, industry and foresight," Barr indicated, saying that IBM has gotten to its position in the market because it produces a better product and the customers know it.

In a letter to the court from Bruce Bromley of Cravath, Swain and Moore, IBM's outside attorneys, the firm requested that the court "cooperate" in issuing a contempt citation to facilitate a full review of the order and the documents.

Bromley admitted he had the documents in question in his possession, but said he had "come to the conclusion that I am not required by law to deliver the documents to the government and shouldn't do so."

However, the government attorneys asserted this position is "in direct contradiction" to the ruling made so far by the District Court in New York and also indicated that it contravened the last ruling of the Supreme Court in the matter when it refused to grant IBM a stay.

Bromley in his letter to the court said if IBM were to deliver the documents as requested by Edelstein, that might constitute a waiver of privilege in the case, even if the Supreme Court later found that on the merits of the case the documents should be held privileged.

"Because of the importance of the attorney-client privilege to the administration of justice, the risk of irreparably depriving IBM of its claim of privilege and the risk of infecting other cases, I have respectfully concluded that I shouldn't produce the documents unless and until it has been finally determined that they should be produced," Bromley said.

However, Bromley said that IBM was "willing" to have the documents reviewed by a special "Master" to determine whether the documents in fact contain information protected by the lawyer-client relationship.

## DPMA Guides Stress Strong Member-Public Bond

(Continued from Page 1)

curacy verification with respect to on-line data such as vehicle files, criminal records and tax data.

### On Every Level

The call to volunteer action extends to DPMA members at chapter, regional and international levels.

On the chapter level, the report urged DPMA members to volunteer as "interested members of their community" to influence city and county DP decisions.

To accomplish this, the report recommended that chapters pick a member as a contact man and identify the local government DPers in their membership. Selling this "free assistance to the city and county officials — can be done very easily," the report stated, "if you start with the mayor or city manager. Tell him what DPMA is all about and the excellent talent you have available to assist him in the information processing part of his administration."

### Education Service

The report noted that many local school systems have both educational and business DP facilities, and suggested this is another area where DPMA can serve the community.

Again, it is a question of telling "the DPMA story" to the school administrators. Interested chapter members should do liaison work, the report said. Memberships should be polled for contacts with the academics.

On the grade and high school levels, "chapter members can assist in the development of the curriculum and help the teachers by acting as advisers."

For adult education, the guidelines recommended surveying the community's employment needs and then contacting school administrators with a proposal. This would list the names of volunteer teachers for courses ranging from computer fundamentals, to keypunch and high-level programming.

Volunteer service as an unpaid consultant "is the best approach to serving the school administrator in his business DP

needs," the report found.

This local involvement would not make DPMA into "a service organization like Lions or Moose; however, our educational activities could extend to joint efforts with the service clubs." A strong effort ought to be made to "contact other organizations within the community for joint activities," the report continued.

In a public relations vein, the report recommended that chapters set up editorial boards "that can respond to letters to the editor, newspaper editorials of a local nature and general newspaper articles in our field of expertise."

At the regional level, the report favored choosing an interested member to monitor legislation that might affect the DP community.

"A council should be set up to review this legislation and, if warranted, communicate a position paper to a legislator sponsoring the particular bill."

Beyond this, the report suggested that a member from a chapter within the legislator's district get in touch with him. "Appropriate controls should be built into the system to make sure we are not violating any lobbying restrictions."

### New Legislation

Members could also contact the region's legislators "to explain our willingness to work with them in developing new legislation."

As for education at this level, "The state/province superintendent of schools should be contacted to inform him of our interest in data processing curriculum, development at all levels including college, approval of private data processing schools and our... interest in educating the public..."

At the international level, the report called for DPMA to hire a legislative reporting service to keep the association informed on legislation that might affect the DP community. DPMA could then respond with a position paper sent to the bill's sponsor.

In addition, DPMA "would also publish summaries of complete position papers in computer-related journals and the news-

papers as warranted by the subject covered."

The report stressed personal contacts with national legislators. "The idea here would be that as the committee takes a position on specific items, the personal contact man would then meet with the individual responsible for the piece of legislation to review our position. This could be accomplished by phone, mail or face-to-face contact with little cost to DPMA."

Similar contacts should be developed with officials in government agencies, the report suggested.

## System Analysis From Scratch...

(Continued from Page 1)

standard cost of production to the actual cost of production expressed as a percentage.

To put these definitions into a working model, Brotherton set up a graph measuring job/hr on the y-axis against the multijob level on the x-axis.

Job/hr was the average number of jobs completed per hour during a specified measurement period.

A specified time period was considered an eight-hour shift, 3 shifts a day, etc.

The multijob level coordinate referred to the average number of jobs simultaneously in a state of execution.

Thus Brotherton chose to ignore events at any one time and quantify his results over a shift or other measurement time. "Work through the system is really directly dependent on the jobs run," he said.

"For example, the best job mix — between I/O- and CPU-bound jobs would produce the steepest line on the graph."

With his theory worked out, Brotherton went to the floor to test his analysis system on GT&R's 370/155 system.

Keeping the job mix and time periods constant he developed statistics that would serve as a base for later comparisons.

Once the base statistics were docu-

mented, Brotherton could change variables — e.g. the number of tape drives attached on-line — and see the results on his graph.

His system realized unexpected support when over one test series, Brotherton noted a 6% production reduction when he thought that none of the variables had changed from the base tests.

But he found on investigation the operations staff had reduced the number of operators from three to two. Later testing using first two operators then three operators — keeping everything else the same — showed that the 6% reduction was a direct result of running with one less operator.

Another advantage of his approach was that if GT&R wanted to see the effect of putting faster tape units on-line, Brotherton could determine after a few test runs the actual effect of this change in his graph before a commitment to purchase.

Or he could determine whether the elimination of several tape drives affected production more than the cost savings.

Thus the analysis method allowed Brotherton to relate back to management on two parameters: how many jobs were being completed and at what cost; and a method of measuring the effects of varying the job mix or hardware configuration on the work/cost result.



## Antitrust Laws, an Historical Perspective — Part II

# Even Sherman Felt His Bill Was 'Totally Ineffective'

By E. Drake Lundell, Jr.  
Of the CW Staff

With the basic American antimonopoly feelings concentrated on the trusts in the 1880s, the politicians were quick to adopt the issue.

The Democrats in particular grabbed onto the issue, since it tied in closely with their antiprotectionist feelings, and adopted resolutions against the trusts at both their 1880 and 1884 conventions.

But their strongest statement against the trusts came at the convention of 1888 where they said "the interests of the people are betrayed when, by unnecessary taxation, trusts and combinations are permitted to exist, which, while unduly enriching the few that combine, rob the body of our citizens."

The Republicans were also forced to adopt the antitrust sentiment, but perhaps more for defensive reasons than because of a true belief in the subject.

The Republican Party, with close ties to the wealthy factions of society, was becoming known as the "party of the monopolists" by many. The idea that it was the party controlled by the rich was catching on.

In part to beat off this image the Republicans also came out against the trusts, declaring at their 1888 convention that "all combinations of capital, organized in trusts or otherwise to control arbitrarily the condition of trade among our citizens" should be condemned and legislation should be passed to limit such combinations.

Since the Republicans won control of both the presidency and both houses of Congress in the elections that year, the job of limiting the trusts as promised at their convention fell to them.

Senator John Sherman, one of the most respected men in the Republican Party, therefore took up the antitrust cause early in the new Congress, perhaps seeing the antitrust issue as the monument that could cap his career.

In introducing the original antitrust bill, it was not Sherman's purpose to outlaw all combinations, just those that stifled competition, raised prices, etc.

However, after an opening round of debate, the original bill was sent back to the Judiciary Committee, where it was rewritten into the bill that would finally become the law of the land.

But Sherman was not happy with the

bill.

In fact, he called it "totally ineffective in dealing with combinations and trusts. All corporations can ride through it or over it without fear of punishment or detection."

But despite this criticism, Sherman was among the majority when the bill was adopted 52 to 1 by the Senate, even though many historians say he voted for it just because it still bore his name.

The law, after debate in the House, passed and was signed into law on July 2, 1890 by President Benjamin Harrison.

The first section outlaws "every contract, combination in the form of a trust or otherwise, or conspiracy, in restraint of trade of commerce" between the states or with foreign countries and declares that anyone found guilty of such action shall be found guilty of a misdemeanor punishable by a fine of \$5,000 or a year

in jail or both.

Section two, however, is the key to the major antitrust actions brought by the government in recent years, such as the government's present action against IBM.

It declares: "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce . . . shall be deemed guilty of a misdemeanor, and, on conviction therefore, shall be punished by a fine not exceeding \$5,000, or by imprisonment not exceeding one year, or by both said punishments, at the discretion of the court."

Section three takes the provisions of section one and makes them applicable to the territories of the U.S.

Section four gives the jurisdiction for trying cases under the act to the circuit courts of the country and gives the attorney general the duty to try the cases

and also permits the courts to issue temporary restraining orders against a company or person being tried if the court feels such action is necessary.

Section five allows the court to summon necessary witnesses, while section six allows the government to seize the property owned by anyone violating the law.

The seventh section gives anyone who has been injured by a trust or other illegal combination or monopoly that is illegal under the law the right to sue in any court in the U.S., "and shall recover threefold the damages by him sustained, and the costs of the suit, including reasonable attorney's fees."

The final section makes it clear that wherever the word person is used in the rest of the bill, the same applies for corporations and associations.

Next week: How have the various courts applied the basic law in past cases?

## Did You Know?

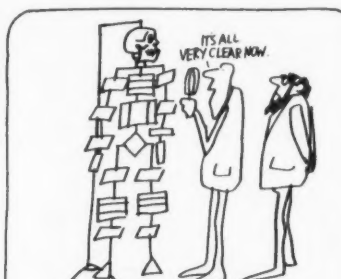
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\*EDP Analyzer, October 1972, That Maintenance "Iceberg," P.1. (Send for complimentary copy.)



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## Reliability, Availability, Serviceability

# Papers Reveal IBM User Dissatisfaction in '69

TUSLA, Okla. — The "leading edge" of IBM users was increasingly concerned about reliability, availability and serviceability (RAS) problems with their systems in 1969, according to Management Committee minutes based on an IBM user survey.

According to the minutes of the study, which is among the court documents in the IBM-Telex antitrust suit, 46% of these customers (266 installations) were dissatisfied with their RAS experience. On the average they were experiencing 148 interrupts a month, accounting for 44

hours of lost time. In addition, an average of 26 hours of rerun time was required.

"As a result, 25% of the customers felt that RAS characteristics would be a significant deterrent to their application growth."

The committee noted the typical customers in the study were using the systems over 400 hours a month and that "one-half of these customers was spending significant dollars on backup with the top half averaging \$7,800/mo for this purpose."

### Degree of Dissatisfaction

"The degree of dissatisfaction moved up with the complexity of the applications and with the size of the system, i.e. Model 30 users are more satisfied than Model 65 and 75 users."

The source of the problems experienced by the users, the study said, was about one-fourth hardware, 20% software, 30% customer personnel and input; and 4% maintenance, with the rest unknown.

## Finding Frauds

CW West Coast Bureau

SACRAMENTO, Calif. — Auditors, DP expertise and computer-assisted fraud seem very much in the news.

The National Association of Insurance Commissioners is reportedly initiating a major study to determine how auditing techniques can be improved to detect frauds involving computers.

It was also reported at hearings here on the Equity Funding insurance scandal that a similar study may be sought by the Institute of CPAs.

In addition, the state legislative analyst has proposed to an assembly committee that the California Department of Insurance hire a supervisory level person with computer background who could set up computer training programs.

William Behnk, who presented the analyst's report, said the supervisor would coordinate the effort to train the insurance department's 50 field examiners.

## Scientist Plays Old Shell Game

ROCHESTER, N.Y. — A University of Rochester scientist is constructing computer models to determine why animal shells developed the way they did and what variant forms they might have otherwise taken.

He said he can produce a readout on computer-controlled CRT of shells that could have evolved, and rotate the image through three dimensions.

Dr. David M. Raup, a geologist, said it is possible to change numbers in the model to come up with "all the forms that could

have evolved. This enables us to see the non-existent forms, those nature rejected as well as the ones it chose."

The method is used to find out "why evolution did what it did and (more important) why it didn't do what it didn't."

Raup said his work has concentrated on shelled animals such as snails and clams.

In considering alternate forms that nature did not choose, he said, "It's likely to be some basic mechanical or physiological reason that a shape didn't work."

## Data Bank Compiled On Bad Checks, Cards

By Toni Wiseman  
Of the CW Staff

NEW YORK — Fraudulent use of credit cards, checks and airline tickets is being curtailed by a computer-based customer transaction monitoring system.

The Validata system from TRW is being used in the western U.S. by airlines and car rental companies, and is currently being installed in New York by TWA.

Validata's computer stores current data on 135,000 lost or stolen airline tickets, 50,000 lost or stolen checks and 750,000 lost or stolen credit cards, according to Peter Bryan, director of TRW Validata.

In the case of an airline, if the passenger wants to pay for a ticket in any way other than cash, the agent presses the appropriate button for check, ticket number or credit card number on a keyboard. Within seconds, an approved message from the computer flashes on the screen — or a negative response.

The system also displays the number of transactions the customer has made in the past several days. If that number is high, the card will be verified.

## ANS Labelling Means Little, X3 Secretary Brown Claims

Special to Computerworld

WASHINGTON, D.C. — Robert Brown, secretary of the ANSI X-3 Committee, told members recently that labelling products "in conformance with ANSI standards" meant little. In accordance with previously established policies of the American National Standards Institute and of the Computers and Business Equipment Manufacturers Association, no action, beyond a letter requesting a change, is usually made when merchants incorrectly identify goods as being up to ANSI policies, he said.

The news came after a magnetic tape cassette was displayed at the meeting bearing the phrase "Ecma/ISO/ANSI standards complied with."

X-3 members noted that, as there was no current ANSI standard for magnetic tape cassettes it was not possible for the labelling to be correct.

## DP Publication Launched

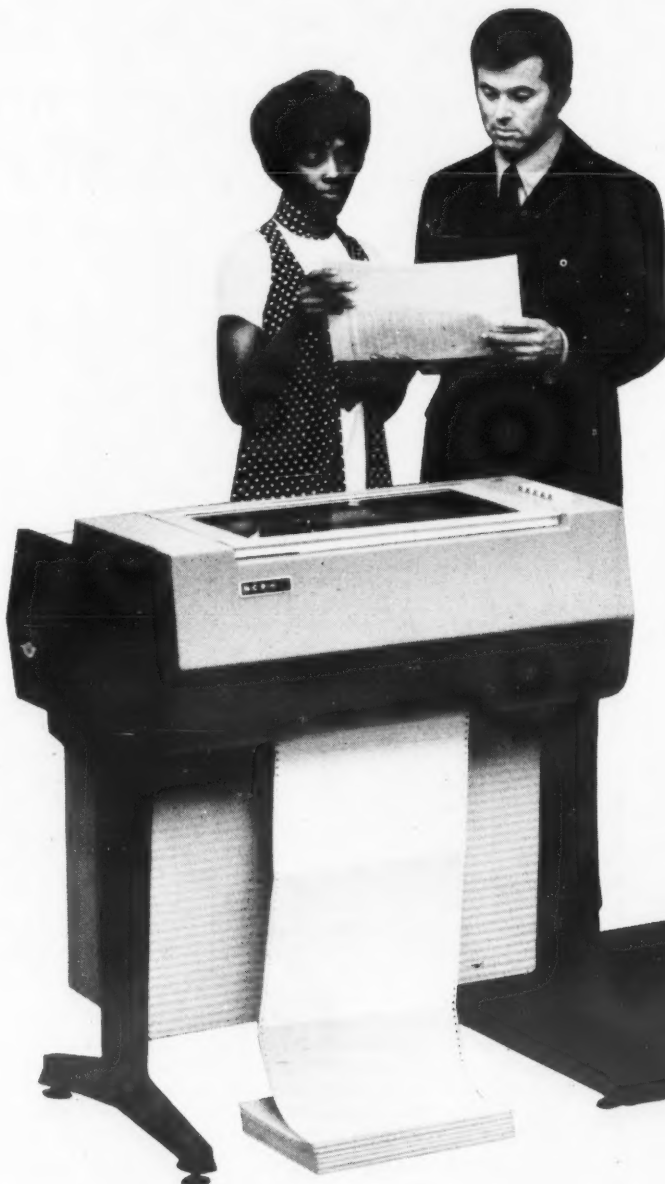
CW West Coast Bureau

LOS ANGELES — A new computing publication, *Popular Computing*, has been launched by Fred Gruenberger, a professor at California State University, Northridge.

Initial issues are in a newsletter form and contain articles about computer problems, puzzles related to computing, book reviews, tabulated results to old problems and reviews of desk calculators.

Subscription rate is \$15 a year from Box 272, Calabasas, Calif. 91301.

# Big advantages in





## Research on Conference Formats

## Computer Compiles Responses

## Group Decision-Making Gets the 'Silent' Treatment

By Ken Shonk  
Of the CW Staff

LOS ANGELES — Interactive, computer terminal networks offer the best capabilities for studying the nature of group decisions and then setting up conferences in which computerized rules and procedures, formulated to optimize accuracy, control the decision-making process, according to Dr. Norman Dalkey, a UCLA engineering professor.

Working at UCLA's Computer Center for Behavioral Studies (CCBS), Dalkey also said that "social ecologists, for example, could hold a conference to work out a world ecology model as the 'Limits to Growth' people did without ever directly communicating with each other.

"The computer would statistically compile the group decisions of what factors were important and what assumptions should be made in the model from the judgments of each individual."

The idea of a conference in which there is no spoken conversation may resemble a sorcerers' convention, but the idea is based on Dalkey's research into group decisions.

Dalkey's past research has shown that the individual with the strongest personality or highest status usually sways the rest of the group to his point of view; open discussion of a question degrades the accuracy of the group's answer as compared with the answer compiled from individual judgments before discussion: and individuals rate their competence rather poorly as opposed to a group, which does a rather good job.

Dalkey plans to computerize the "Delphi" decision-making format in which each member of a group responds to a question independently and anonymously, thus eliminating group pressure or the sway of a particularly dominant person. The responses are collected and

statistically evaluated and then reported back to the group as the group decision.

The advantage of this method Dalkey said, is that researchers in decision-making have shown Delphi to be more accurate than traditional conferences.

"The speed of the computerized system, offering almost instantaneous data collection, analysis and feedback, would allow easier and wider use of Delphi, which is already frequently used in government and industry in making projections," said Dalkey, one of the originators of Delphi 25 years ago.

"Our present set of experiments with the computerized Delphi system aims at learning more about how subjects use information in making judgments or estimates of uncertain quantities," Dalkey said.

"Ultimately, we're interested in manipulating factors such as the presentation order of factual material, group interac-

tion and value judgments that affect group decision accuracy to improve the decision process. All of these factors would have to be controlled in any conference situation for the results to have any real use."

Within the next several months the CCBS system, which became operational the first of this year, will be tied into a national computer network. CCBS's terminal network has 24 stations tied into a PDP System 10 with 256K. Each terminal has a CRT display and teletypewriter and voice communication facilities.

Dalkey's research has also concentrated on computerizing a statistical way of making value judgements.

In the first step in approaching an issue or problem each individual lists those characteristics he considers important. The individual then takes the entire list and groups those characteristics he considers the same or similar.

The computer then processes the resulting similarity matrix and comes up with the overall group judgment of just what is important.

A shake-down experiment in which 27 engineers were asked what seven characteristics most affected the quality of their life reduced 227 items to 12 basic factors.

Using CCBS's computer terminal network in his more recent research into group decision processes, Dalkey discovered that the manner which a group is given information relating to the question they are to answer is important.

"Additional information, for example, won't determine an individual's answer," Dalkey noted, "but it does increase accuracy, all of the improvements coming from the first two or three pieces of additional information. Interestingly enough, each additional item affects the answer relatively independently; it's the order that's important."

## Locust Swarms Focus Of Pest Control Study

LONDON — The plague of the locust is almost as devastating today as it has been for thousands of years for farmers in Africa, the Middle East, Afghanistan and Pakistan, but computers are helping scientists move closer to locust control by studying their lifestyles.

Since only swarming locusts destroy crops, Dr. Tony Cosens of the Center of Overseas Pest Research (COPR) has set up a test chamber to discover why locusts swarm and how they can be prevented from doing so. The locust hangs in the middle of an airstream and, by the use of lights, a moving conveyor belt below and varying "weather conditions," an illusion of flight is produced.

Data is processed on an enhanced Hewlett-Packard 2116B and the relevant data is stored for later use.

COPR can claim much of the credit for the reduction in size and number of locust swarms in recent years. The last serious outbreak, in 1968-69, was nipped in the bud by forecasting where the gathering swarms would fly and then eliminating them by the use of insecticides.

## DP Yields Corny Results

SULLIVAN, Ind. — An annual farmers' corn yield contest's entries are validated yearly by a disinterested observer — a computer.

Project: 200, established by the producers of Funk's G-Hybrids, is a high-yield corn growing contest, with more than 5,500 entries in 1972. The summary of the participants' entry data is also helpful for studying techniques used by corn growers striving for higher yields.

For example, the 1972 summary shows that almost half the growers fall-plowed their corn land.

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benchmark. And then got wiped out by the 840's more-than 10-to-1 price advantage.

Or the DECsystem-1050 that cost eight times more than the 840. And was actually 7% slower running the benchmark.

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## Editorials

### A Voice for the User

It appears likely that the Data Processing Management Association will become a part of the umbrella organization in the computer industry known as the American Federation of Information Processing Societies.

For years Afips has lacked any true user voice in its policy-making councils — a lack that has been apparent to almost all observers.

DPMA membership can help fill this void in Afips and give the computer user the voice he needs in determining policy in the organization that purports to speak for the entire computer community.

Let's hope the negotiations over DPMA membership don't get bogged down in economic matters relating to the conferences run by both groups. The good of the computer user and the industry should outweigh petty organizational or economic problems.

### ...More Power to Him!

The recently concluded National Computer Conference proved the computer industry can no longer take the user for granted.

In its quest to include practical user-oriented sessions in the NCC, Afips has provided the user with a new forum to speak his mind.

Perhaps most typical of this new attitude was the impromptu debate that emerged at one technical session. One panelist took the unprecedented step of challenging the validity of a paper presented by another panel member.

The discussion was joined by conference attendees who staunchly defended the need for practical problem-solving sessions at a professional computer conference.

There will always be technical pioneers in our industry who will present their exhaustively researched findings at computer conferences. We should not discourage these contributions to the state of the computer art.

But neither should we object to more practically oriented problem-solving sessions. The user, too, deserves some answers.

### Taking Care of Business

IBM has leveled a serious charge at the Department of Justice in its claims that the government has destroyed documents that might be helpful to IBM.

But at the same time, the IBM request for document preservation by the government is extremely broad and includes every document relating to data processing that is in the government, the world's largest computer user.

The defendant clearly has the right in trials of this type to ask for — and to receive — all the government documents that are relative to its case. The government, as shown in the Eillsberg case, does have a special obligation to produce the evidence it has that would be useful to the defense.

But it would be a mammoth job for the government to keep, store and classify all of its materials relating to data processing, particularly since many of them are scattered, and the value of most of them to IBM is questionable.

What must be done, then? The government should not engage in any further destruction of records that are truly useful to IBM.

And IBM should limit its request for government documents to those that are germane to the case and should not use the excuse of government document destruction to further delay this already dragged-out case.



'Bless You, Sir!'

## Letters to the Editor

### Breaking a System— What It Really Proves

"Be Safe — Try to Break Your System" [CW, June 6], suggests such tests, if negative, will be of doubtful value. They only prove that the attempt to penetrate failed, not that penetration is impossible. Furthermore there is no assurance that the test, even if successful, will identify all weaknesses. To be worthwhile the penetration tests should be based on a detailed analysis of the system.

Robert V. Jacobson  
Vice-President

Sentor Security Group, Inc.  
New York, N.Y.

### Beware Ignorance Of Software Basics

It's lovely when your critics prove your points. I did suggest that while RPG was useful in some applications, the RPG-only programmer was likely to remain ignorant of some standard data processing techniques.

Along comes Jerry C. Swantek who feels certain that segmentation and subscribing are excuses for more expensive hardware. Of course segmentation reduces core requirements, and subscribing is as old as Von Neumann and is used on everything from minicomputers to the biggest machines.

But these are software techniques, and it was this sort of ignorance of basic software capabilities that I warned against. I have in my time reduced hardware costs 30% and at the same time gone from an RPG-only computer to one that offered both Cobol and Fortran.

John R. Culleton, Jr.  
Sykesville, Md.

### 20 Lbs of Trash Are 20 Lbs of Trash

The last paragraph in the article about hospital MIS [CW, June 6] ("Cost of running the system comes to \$82,750/mo and is expected to save at least that much in the long run, officials believe") reminds me of a recent article in *Consumer Reports* magazine, concerning the evaluation of the newest appli-

ance fad — trash compactors.

"Is it really worth spending \$200 to convert 20 lbs. of trash — into 20 lbs. of trash?"

M.D. Kovalik

Columbus, Ohio

### Private Enterprise Vs Local Government

A June 6 article in *Computerworld*, "Counties May Pay Too Much . . ." repeats allegations made by a local politician that Iowa Data Processing "overcharges" our clients and generally provides poor service, but missing from the article was the fact that the politician's government, Linn County, Iowa, has been seeking for some time to go into direct competition with us for some of the services we offer counties throughout this state. Also, his comments were part of a sales campaign waged to induce one of our clients to drop our services and employ his county's data processing department instead.

When the politician quoted in the article, Merle L. Kopel, tried to sell Linn County's DP services to one of our clients, Johnson County, for voter registration, the Johnson County auditor investigated the cost-effectiveness and services of both systems.

The Johnson County auditor rejected Kopel's overtures more than two months before CW printed Kopel's remarks.

The article quotes Kopel as saying that Iowa Data Processing "ran last year's primary election and mistakes abounded." The fact is that we have never run any election for Kopel or his county.

Kopel also said that Linn County cancelled a contract with us when he took office recently. The facts show we cancelled out Linn County six months before Kopel took office.

Kopel claimed we overcharge for certain supplies. The fact is that we provide the supplies in question to our clients without charge! He further stated that we quoted a price for supplies to him, but we made no such quotation . . . we were not allowed to.

We wrote him a letter last February asking for an opportunity to submit competitive bids on election supplies, but that request has never been acknowledged.

We use the transaction method because it allows our counties to predict their exact costs (they must budget 18 months ahead of time) instead of being liable for unknown amounts of extra computer time caused by operations problems or program development; and also because we are in the business of providing a complete service, not just selling computer time. Our service provides everything from the forms to register voters to post-election analysis.

Our firm is accused of using "scare tactics" in marketing, according to the article. We defy anyone to substantiate such a charge.

The article also accuses us of getting self-serving special interest legislation onto the books. Our only involvement with legislation occurred a couple of years ago when, because of our specialized knowledge, a group of election officials from throughout the state invited us to help them work for needed election reforms.

Thus any work on legislative bills was done at the request of those united election officials, approved by them at every step, and we have not been involved in lobbying since then.

Stanley R. Zegel  
General Manager

Iowa Data Processing  
Cedar Rapids, Iowa

### Car Pools in Demand

To restate L.A. Jaroch's request in the June 6 issue of *Computerworld*, I would also welcome any information available in setting up car pools.

Michael J. Mahoney  
Columbus, Ohio

*Computerworld* welcomes comments from its readers. Letters should be addressed to: Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.



## On Interface Standards

# Official Gerrymandering Decides Who Speaks for U.S.

In two previous columns the question of whether the computer community wanted to consider suggested interface standards was raised. In the first column [CW, May 9] the recommendation by the American National Standards subcommittee responsible for determining the American position on a proposed international standard (that the U.S. not participate in an international standard interface project) was reprinted, together with the published committee reasoning. This reasoning included a statement that the National Bureau of Standards was opposed to even a single federal standard in that area.

In the second column [CW, June 20] it was reported that NBS's Dr. Ruth Davis, pointed out that the NBS comment had been taken completely out of context. She noted that the NBS strongly supported action in the interface standard area. What the NBS did not want was a single standard — instead they wanted several. As the NBS comment was the only data supplied by the ANS committee in support of their opposition to the Japanese draft, the vote result was meaningless. It raised the question again as to just who really did speak for America — and just what authority they had, or control they were under when speaking.

The senior committee that "approved" the American position on the Japanese standard was the ANS X3 Committee. Under American National Standard Institute regulations, X3 — like the other ANS committees — is supposed to be balanced so that interests of the general public, people involved in working with the stan-

dards, and makers and buyers of potentially standardized equipment are all effectively represented.

Balance is achieved — so goes the theory of the American National Standards Institute — by restricting the membership on these senior committees to trade associations, rather than single companies.

### Serious Abuse Possible

This is necessary, according to the Ansi guide, to prevent abuse through unfair representation of industry segments. The committees are supposed to exercise caution in allocating representation to individual companies, as abuse here would — so Ansi says — cause the erosion of the foundation of Ansi operations, and eventually the entire Ansi structure would fall.

The X3 Committee, however, includes representation from computer mainframe companies, not from their trade association, the Computer and Business Equipment Manufacturers Association (Cbema). These companies individually vote on an equal basis with other members, and so far, have voted about 10 times under the provision that allows company membership, if the trade association does not have a standards activity.

Where Cbema would normally have one vote, it actually has 10. Mainframe manufacturers, such as Burroughs, IBM, Xerox, etc., should logically find their voting power in a trade association matched against the peripheral manufacturers, who do not make mainframes, and who are therefore much more interested in having standardized interfaces, but this does not occur. At present, the peripheral manufacturers don't have 10 votes — they don't even have one. And yet they are substantially concerned, involved and affected. X3 is simply not balanced properly, and how can this not be considered

an abuse of Ansi's goals?

The pretext for this gerrymandered voting situation may or may not be legal. The official reason is that Cbema has no standardization activity, and therefore declines membership.

The concept that Cbema has no standardization activity will be news to many people. It certainly was to me.

Cbema (previously Bema) has had a standards department for a long time — at least 10 years. I worked with it in 1963.

Cbema certainly has a director of standards. In fact activities of the standards departments were a major part of the Bema organization. Cbema certainly has standardization positions to push.

In the most recent issue of the X3's Steering Committee report it is noted that Cbema opposes any certification process for any X3 standards! (Ansi is officially in favor of certification processing.)

Moreover Cbema, through its paid staff, provides officers for standardization committees, and even makes decisions officially on behalf of the committees.

The actual decision to go ahead and instruct the delegates to the International Standards Organization to vote against the Japanese standard was made by a Cbema employee and Ansi committee secretariat, Robert Brown. He was aware the National Bureau of Standards report had not been adequately quoted, and there would also be serious opposition to the decision in that the technical subcommittee concerned had simply not done its job. A secretary should not have made the decision, but Brown did, so showing that Cbema does have a standardization activity, and is in fact a participant in perpetuating the gerrymandering of the X3 committee. Brown pleaded that in view of the urgent need to have some form of a decision, he was making it.

Presumably, Ansi is aware of this decision and this background. It is aware of the importance and influence of an Ansi committee secretariat. They are aware of the impact of having 10 votes where only one is usual.

However, Cbema holding the secretariat, and other standards activities, is apparently not considered by the president of the institute (Roy Trowbridge) as being a standardization activity.

In fact, Trowbridge recently had the matter investigated. The investigation stopped after Cbema claimed it did not have any standardization activity. Then Trowbridge proceeded to accept the gerrymandered effect on the X3 voting as all right. Some investigation!

As a result of Trowbridge's ruling, it now seems unlikely that any change in the X3 membership (to bring it into line with any realistic interpretation of the Ansi rules) will be forthcoming.

This Ansi action again brings up the question as to who really speaks for America. As I see it, it now appears that a small group, such as X3, can speak for America, under the protection of the president and staff of Ansi, although membership is gerrymandered, and the data upon which its votes are based is taken out of context.

Of course there is always the possibility that even the president of Ansi can go too far. He does not have unlimited authority, and he does have to answer to his members, as well as his board of directors. But only they can do anything now to protect against the abuse of special interests pulling down the Ansi building.

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## Cobol Standard Your Responsibility, Grace Hopper

"Afghanistanism," in newspaper parlance, is the practice of a paper dramatically attacking distant problems which do not impact its advertising income, while leaving untouched the nearby areas in which it could be effective, but also embarrassed.

Thus, during the recent civil rights movement, it was regarded as an example of Afghanistanism for the Northern newspapers to attack Southern practices on discrimination, while staying quiet about similar problems in their own towns.

Reading about Dr. Grace Hopper's advice to users [CW, June 13] I could not help feeling that the leading lady of computers has apparently gotten a bad case of Afghanistanism. She is asking people who are not in a position to do anything very effective to do the work which she could and should have done effectively. This is not to say that Hopper could do anything effective in all the standards areas — but she certainly could have been a lot more effective than she has been in what is the key user arena — Cobol standardization.

Hopper may well be the only person in the world who can be effective in the Cobol area. But the public record shows that to date, despite this opportunity, she has not been able to stop Cobol standardization from being abused. Moreover, this has occurred not merely without her opposition, but under the mantle of her great technical reputation.

Because of this I think it is up to Hopper to do something effective in improving Cobol standardization before she has the right to ask the users to demonstrate against the manufacturers.

### Codasyl Membership Rights

These are strong words and ones I never expected to write for I have great admiration for the work Hopper did in the

1950s. But she sits on a body that calls itself the Conference on Data Systems Languages Executive Committee. The conference describes itself as being a set of individuals; membership is by membership on one of the committees.

Factually Codasyl is not a set of individuals. In the essential committee, the Programming Languages Committee, individuals are not even allowed to serve! But Hopper's employer, Univac, sits as a member, together with the other manufacturers.

*Hopper may well be the only person in the world who can be effective in the Cobol area. But the public record shows that to date despite this opportunity she has not been able to stop Cobol standardization from being abused.*

Yet Hopper continues on the Executive Committee. She does not protest this misleading of the users, of Ansi and everyone else. She continues to give silent approval when she could be effective, by stopping both public misrepresentation, and corporate usurpation.

Constitutionally, the conference is supposed to operate in public. But it does not. Users are refused access to the proposals to change the language, or to the justification of these proposals. However, manufacturers routinely obtain access to them whether or not they are members of the conference.

Again Hopper's mantle is helping conceal the misrepresentation of public operation.

The conference is supposed to be repre-

sentative of users. Yet its officers form a self-electing clique. They may be users themselves, but they are certainly not organized to be influenced by the common user. Therefore, they have no right to be called user "representatives" in any meaningful sense.

Again Hopper's mantle is helping conceal the factual powerlessness of Cobol users in the Codasyl set-up.

So much for the old problem and now for the new problem.

Codasyl has been under attack publicly for over a year. It has failed to publicly answer its critics, or to allow its records to be examined so that the charges against it can be either refuted or confirmed.

As a direct result of this passivity, in conjunction with the executive committee, its refusal to insist on the planning committee's operations being properly monitored, and its permission for the publication of an unauthorized newsletter, the level of escalation of Codasyl's problems has now hit human tragedy proportions. This has inevitably led to the intolerable situation where one man at least considers that he has been "crucified."

Yet Hopper has made no move to open lines of communication from her side. She has preferred to let the matter slide until a Greek tragedy is now unfolding.

Hopper's comments about user demonstration may be perfectly valid, but she has neither resigned from that body nor convinced the executive committee of Codasyl that users have a right to have full and correct information about Codasyl and that charges should be responded to before a level of human tragedy is hit. I believe therefore that this conduct forfeits any right she has to put any work on the user.

One final word. Hopper is a great person. One time I remember her telling me that being a woman, she has many advantages in the game of computer pioneering. One such advantage is that as a woman she has a right to change her mind.

I hope she realizes that my denunciation — for it is no less — is written to prod her into using her feminine prerogative at this point. I value the work of all the people who used to gather at 19th and Allegheny, and whom she referred to as "her boys." We do not want that work or those people to be destroyed in the future. Yet this is the danger which now directly confronts us.

I hope that with the help of Hopper, it can still be averted. It is with this hope in mind, and in my belief that she still values both her boys and their work over her position on Codasyl that I address this appeal to her.

Let us offer Cobol — and Codasyl — to the people.

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## The Professional's Viewpoint

# PLC Must Start Educating Users

By Ron Stewart

Special to Computerworld

Re Fred R. Forman's "Viewpoint" [CW, April 11]; Christopher Coddington's "Viewpoint" [CW, May 2]; and Forman's response in the May 23 "Viewpoint":

The original problem addressed by Alan Taylor, and which Forman refuses to recognize, is secrecy. It's official, as stated in a letter from Ronald Ham to Taylor refusing to release proposals received by the Programming Language Committee.

Forman refutes this by saying, in effect, "Let them eat cake. In the magniloquence of PLC, we shall bestow upon the users the *Journal of Development* and the minutes of PLC meetings. Be thankful. After the fact is after all better than no facts at all."

Neither Taylor nor Coddington suggests that the Cobol Coordinating Committee should stand between the user and PLC, and this is pointed out by Coddington in his "Viewpoint."

Rather, as has been suggested several times, Cobol Coordinating Committee would provide a mechanism for making proposals public. This would enable the Cobol community to forward comments to PLC so that PLC could consider the needs and desires of the user along with the proposal.

Forman points to industry, government and union committees where the concept of representation does indeed work well. This is not due to informing concerned persons of "decisions that have been made on their behalf" as Forman claims, but is due instead to not attempting to conduct business that should be public with the secrecy imposed arbitrarily by Ron Ham.

The Data Base Language Task Group proposal is the first time in the history of PLC that a proposal has been put in the public domain.

I think it quite unfortunate that the user community was unable to make known its needs and desires concerning the collating sequence proposal which was put together in haste, passed by pressure brought to bear after the end of the PLC meeting at which the proposal was defeated, and then adopted as "standard" by Ansi's X3J4.

I therefore call on Codasyl and, in particular, PLC. It is time to educate the users.

The users of Cobol are entitled, as in any other association based on representation, to full knowledge of all proposed actions contemplated by PLC in sufficient time to allow for reaction by these users.

Ron Stewart is a data processing manager in the Chicago area, and a leader of the Society of Professional Data Processors.

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## Upgrade? Switch?

# User Tests Ease CDC System Choice

By Don Leavitt  
Of the CW Staff

BLOOMINGTON, Ind. — Sometimes benchmarks show that advantages to be gained by shifting from one operating system to another outweigh any problems that may be caused by the conversion. At Indiana University preparations are underway to shift a large-scale CDC 6600 from Scope 3.3 to Kronos 2.1, even

though the latter won't be released by CDC until next month.

Late last year, personnel in the university's Wrubel Computing Center (WCC) realized the batch and interactive load would soon be too large for Scope 3.3 on the 96K 6600. They saw three alternatives: move up to Scope 3.4, which had recently been released; switch to Kronos 2.1 when it became available; or upgrade Scope 3.3 as an in-house project.

The local remake of Scope 3.3 was felt to be impractical; the changeover to Kronos, possible but potentially troublesome; and the transition to Scope 3.4, likely to be the "most sensible" approach. But the WCC staff decided to do some testing first.

### A Day in the Life

Study groups headed by WCC systems programmers Ann Bardin and James Haskett analyzed batch jobs from a typical busy day in terms of system resources utilized. A spectrum of 100 jobs was put on tape, to be used to make a miniature population similar in requirements to the whole day's work.

Three test patterns were followed operating under Scope 3.3 (for control comparisons), and under Scope 3.4 and Kronos 2.1 which CDC had provided for the occasion. As each test began, a request to unload the batch job tape put all 100 jobs into the input queue within a few minutes. This operation was repeated, when possible, three times in each test environment so that a total of 300 batch jobs were to be processed.

Concurrent with the batch work being run, Bardin explained, interactive terminals were simulated using CDC's Simulator package.

## Scope? Kronos?

Run with eight active terminals, the average number of users on the day chosen, were made on all three systems, she said, and additional runs with 32 active terminals were made using Scope 3.4 and Kronos 2.1 since WCC expects to reach 30 concurrent users (the system's physical limit) next year.

### Kronos Showed Well

The results under Scope 3.3 and 3.4 were very similar, Bardin continued, with "really no significant differences in performance." But Kronos showed up very well, indeed, she said.

With eight active terminals, all 300 batch jobs were completed in 14% less time under Kronos than Scope 3.3, and in 2% less time under Scope 3.4 than Scope 3.3. With 32 active terminals, Bardin reported, Kronos completed the batch jobs in 35% less time than Scope 3.4.

Turnaround time for a given batch job varied by job size and interactive terminal load as well as by operating system en-

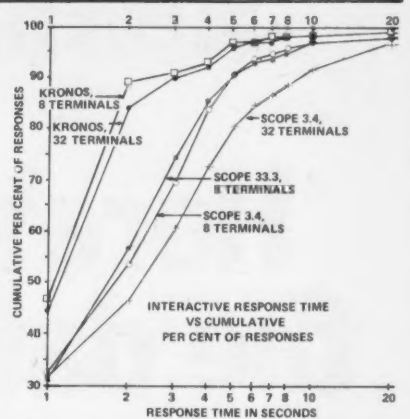


Chart plotted by WCC staff shows distinct difference between Kronos and Scope performances for terminal users.

vironment, she added.

For the terminal users, response times were consistently better under Kronos than under Scope. At the same time, she noted, the Scope terminal handling software, Intercom, dominated the machine "to such an extent the batch jobs could not get through."

"Kronos is not a panacea," Haskett concluded, "but because of the gains in performance, the conversion will be worth the effort."

## Random Notes

### Interactive Cobol Support Added to Tymshare Service

CUPERTINO, Calif. — Interactive Cobol development and support routines have been installed on Tymshare Inc.'s international computer service network, Tymnet. Capabilities include a fast compiler, interactive debugging, support for indexed sequential files and a "short-hand" or abbreviation translator.

The language implementation also provides a report writer/generator, an interactive editor for data entry, subroutine capability, internal and external sorts, and a decision table processor. Tymshare's Cobol follows Ansi standards and is compatible with international standards as well, the company said from 10340 Bubb Road, 95014.

### Personnel Accounting Package Gains Forecasting Feature

KING OF PRUSSIA, Pa. — A staffing control feature recently added to the Personnel Accounting and Skills Search (Pass) package from International Systems Inc. enables users to anticipate future needs. Based on exponential smoothing techniques, the forecasting feature allows weighting factors to be adjusted for seasonal trends or extreme movements of the economy.

Pass operates under DOS or OS/360 in 40K bytes of storage. ANS Cobol source code is included in the \$9,400 package from 150 Allendale Road, 19406.

### RCC Accesses Datapoint 2200s

PALO ALTO, Calif. — Remote Computing Corp. has expanded its 120 char./sec support capabilities to include the Datapoint 2200 intelligent terminal.

RCC's support for the Datapoint equipment includes programming and software for Computer Aided Data Entry (Cade) applications. This off-line editing and pre-processing includes CRT displays; full program control of entries; verification and correction by field; and the ability to check batch totals, all on the user's terminal.

## \$100 'Bypass' Speeds Debugging

CANOCA PARK, Calif. — Program testing under either DOS or OS/360 can be more effective and less time-consuming if the application program being tested includes access to the Data Exception Bypass Routine now available from Joseph Sider & Associates Inc.

As its name implies, the Bypass routine is designed to get program tests past minor problems caused by clerical errors — such as a failure to properly initialize a data field — so that more serious logic problems can be quickly recognized and hopefully solved.

Without a routine such as Bypass, Sider noted, a test would "abort" as soon as the first data exception occurred and serious debugging would be delayed until the user could clear that probably-minor problem and wait in line for another shot on the computer.

The concept behind Bypass is not new,

the developer admitted, but it is one that too few users have put to good use in their own installations. The \$100 Sider charges is probably less, he said, than it would cost the user to develop his own comparable routine.

Bypass comes into play whenever a program check interrupts the execution of the program being tested. Instead of allowing the test to be dumped, the Sider routine checks the reason for the check. If the problem is anything but a data exception or decimal divide overflow the "abort" continues as usual.

If a packed decimal field is at fault, however, Bypass logs the details of the program check — the location of the failed instruction and the contents of the data fields — then zeroes the bad data and returns to the program to reexecute the interrupted instruction.

Sider & Associates is at 6701 Variel St., 91303.

and test alternative plans of action.

FMS provides a means of studying both the impact of divisional or department decisions on the whole corporation, and the impact of corporate-level decisions on the individual operating division.

The system requires development of the user's own file of experience but it is not completely "self-centered" in the data available. FMS includes access to the data base developed by the National Bureau of Economic Research. The time series information in this data bank dates back to 1946.

To aid in looking ahead, FMS gives the financially attuned user several routines for developing depreciation computations, rate of return, loan analysis, time value of money and similar calculations, using conventional alternative techniques.

The models available under FMS are all parameterized so the user can change items on a highly selective basis, without disturbing the rest of the factors. A single parameter, for example, defines the depreciation method used, at the corporate or subdivision level, so that a manager can see what effect changing that accounting technique might have.

While various features of FMS have been available through other analysis routines, TSR spokesmen claimed their service is the first to integrate so many facilities into a single unified system.

TSR is at 777 Northern Blvd., 11022.

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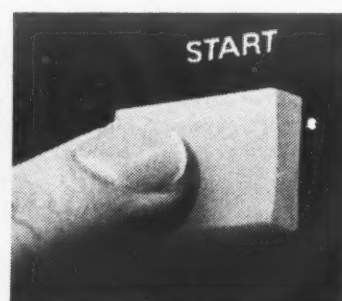
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## 'Minimal' Effort Moves Minis

SYDNEY, Australia — Data General Nova minicomputer users with configurations as small as 8K can have modifiable operating commands, reentrant machine code for applications, mnemonics for writing applications programs and multiple concurrent jobs for interactive work, with the Minimal interpretive machine language system developed by Interactive Systems Pty. Ltd.

Minimal is independent of all Data General software and includes a real-time operating system, data entry routines to handle key-to-tape and key-to-disk operations, and data transmission software.

The system also supports use of Calcomp plotters, and the Minimal "package" includes various hardware diagnostic and demonstration programs, the company added.

Since it was developed to handle interactive program development and maintenance, the system does not include assembly, loading and patching cycles. It is a load-and-go interpretive system and the interpretation speeds are fast enough, according to Interactive, for use at the I/O interrupt level.

Since the operating system itself is written in Minimal, users can work directly with its logic.

Interactive Systems Pty. Ltd. is at 114 Toronto Ave., Dee Why West 2099.

## 'Adapt' Controls Programmer Actions, Libraries of JCL, Source Code, Data

OMAHA, Neb. — Managers of 360/370 OS shops, including those run in a virtual storage environment, can control JCL jobstream procedure libraries, source program libraries and data files with the Adapt software package from Consolidated Business Systems.

JCL procedure library support allows users to store whole jobstreams and withdraw them for use through the submission of a single control card. This facility relieves both the programmer and the computer operator of considerable card handling with its potential for error, Consolidated remarked.

Adapt includes an inventory of programmers and their skills, and a file showing primary and secondary programmer responsibility for each program. Before a proposed change to stored JCL, programs or data is posted, the Consolidated software verifies that the submitting programmer is in fact authorized to perform the function.

This provides protection, the company explained, against accidental and deliberate but unauthorized modification or destruction of the programs, JCL or data controlled by Adapt. Once a change is made, all information concerning the activity is posted to a history file so management can later audit who made changes, when the changes were made and why.

The material stored by Adapt can also be used to generate, through a self-contained report selection option, cross-referenced listings of the programmer responsibilities, or a compilation of all activity performed by a specific programmer.

Other possibilities include providing management with a daily "snapshot" of programming activity for the entire staff, a Consolidated spokesman suggested.

By the nature of their uses, the JCL procedure library and other data controlled by Adapt is normally stored on disk, the company added, so that storage medium should be considered part of the configuration needed to support Adapt.

The software does not involve any changes to IBM's OS or VS coding. The Adapt package is currently available for a one-time charge of \$3,900. Maintenance and new releases are available for \$600/yr.

Alternatively, the system can be rented for \$150/mo from P.O. Box 6173 Elmwood Park Station, 68106.

## 'LSC' Entries Build RPG Logic Skeleton

VALLEY STREAM, N.Y. — Programmers who like the non-procedural approach of RPG and RPG II, but who dislike the multiplicity of specification sheets needed to get programs organized, can now use the List/Source Compiler (LSC) package from Computer Procedures Corp. to generate skeleton RPG source code.

LSC creates basic file description, input and printer output specifications, with minor accumulation capabilities, based on three card types punched from a single coding sheet.

### No Test

LSC does not provide, however, any tests for selection of valid input data records or rejection of invalid ones.

As generated, the RPG skeleton may include logic to list and/or accumulate totals from whatever records are presented as input, as long as they meet the basic file definition tests.

Before running the LSC output against an RPG processor, users may "flesh out" the skeleton with RPG source code of their own, to define acceptable records and to extend the calculations.

LSC is currently available for use on the 360/20 and on larger CPUs of the 360 Series under DOS. As part of the RPG source program skeleton, the package also creates a complete JCL deck, the company said.

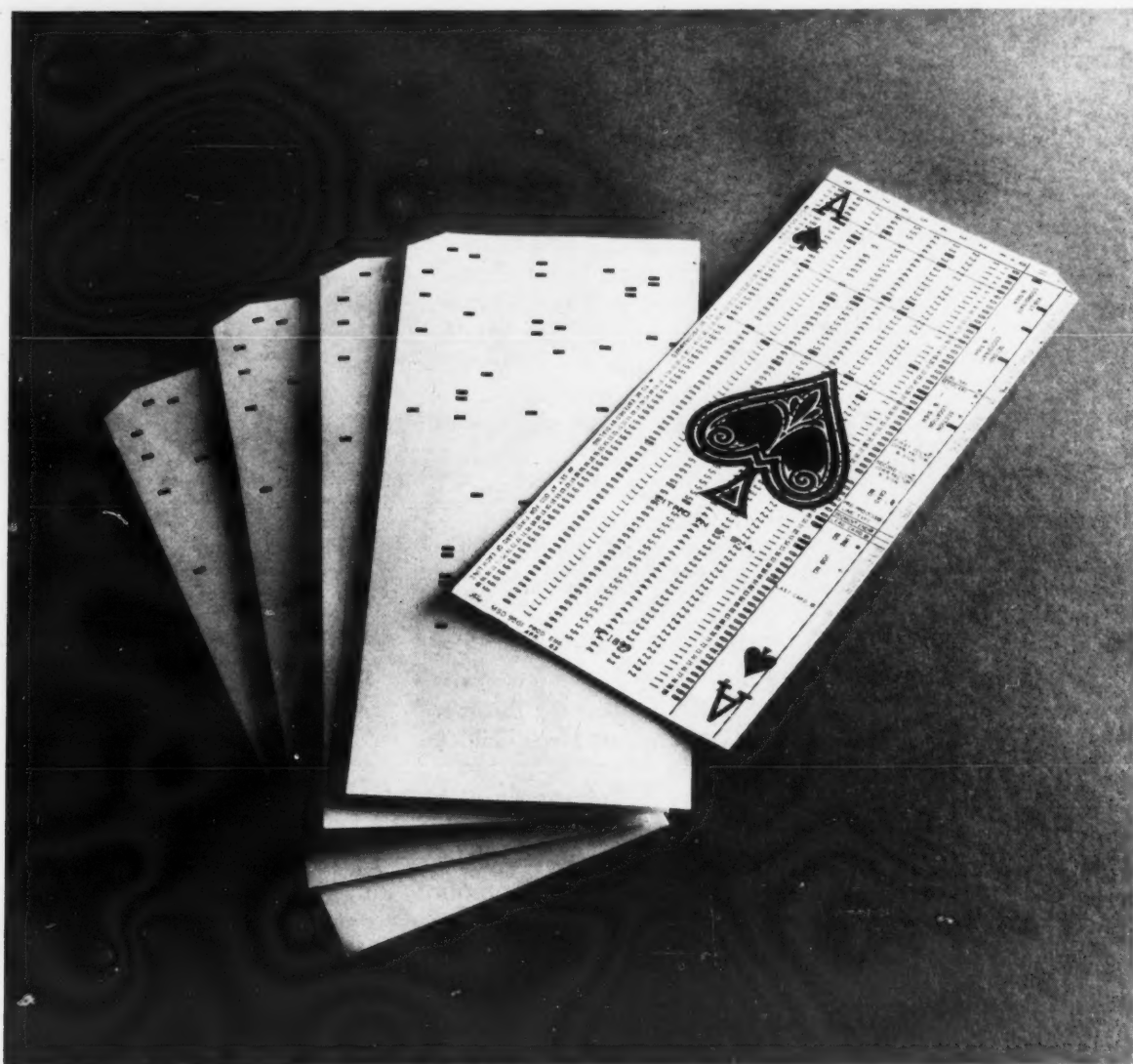
LSC requires 8K bytes of core and costs \$199.

Computer Procedures Corp. is at 181 S. Franklin Ave., 11581.

## Tapes Transmitted

NEW YORK — Subscribers on the SDL International time-sharing network can have tape files available on a 360/85 in Ottawa minutes after they are transmitted from a mag tape-equipped terminal in the company's branch office here. Once added to the library in Ottawa, they are available "on demand" for processing with a maximum 20-minute turnaround, a spokesman noted.

While tapes are usually delivered to the local SDLI office, at 437 Madison Ave., to be sent to the 360/85, users with their own tape-oriented Data 100 terminals can transmit their tapes directly to the data center in Canada, the spokesman added.



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## Data Briefs

### TTY-Compatible Printers Offered by Kleinschmidt

DEERFIELD, Ill. — SCM's Kleinschmidt Division has unveiled its 7300 Series TTY-compatible character printers which the firm said are up to 50% less costly than its earlier models. The RO, KSR and ASR models operate at 30- to 40 char./sec and use standard teletype-writer paper.

Switch selectable rates of 50-, 75-, 100-, 110-, 150-, 200- and 300 bit/sec are standard and columnizing and tabulating options are available.

Purchase price of the RO unit is \$1,975. The KSR model costs \$2,275 and the ASR \$3,950. Lease plans are available. Delivery is 90 days from Lake-Cook Road, 60015.

### Trendata Has Cassette Unit

SUNNYVALE, Calif. — Trendata is offering a tape cassette conversational terminal with correction, formatting and editing capabilities.

The Model 1500 is compatible with systems using IBM 2741 terminals.

The terminal consists of a heavy-duty Selectric typewriter, a Trendata printer actuation mechanism, and the tape cassette.

The Model 1500 costs \$6,450 or \$178/mo including maintenance. Delivery is 30 days from 610 Palomar, 94086.

### GTE Adds to Data Set Line

SAN CARLOS, Calif. — GTE Lenkurt is adding the type 26U-1200 data set to its line of data communications systems.

The 26U transmits data asynchronously at up to 1,200 bit/sec over a voice-grade telephone circuit. The unit is particularly suited for point-to-point, multipoint and polling data applications, the firm said.

The type 26U-1200 is compatible with the Western Electric-type 202C data sets for dial-up service, and with the Western Electric-type 202D data set for private line applications.

The 26U costs \$499. Delivery is 30 days from Dept. C720, 1105 County Road, 94070.

### Multiplexer Allows 22 Channels

ANAHEIM, Calif. — Data Products, Lear Siegler's Electronic Instrumentation Division, has come up with a frequency division multiplexer that permits up to 22 multiple data channels on a single phone line.

Available in 1- and 4-channel subset versions, the multiplexer will accept up to 600 bit/sec rates.

Price for the single channel version is \$585. The 4-channel, fully loaded version costs \$2,165. Delivery is 30 days from 714 N. Brookhurst St, 92803, s.

### Clarification

The GTE Lenkurt 26D data set [CW, June 6] costs \$2,700 for the basic unit. Options can increase the price to \$3,625, the firm said.

## Why Is IBM NCP Software Delayed?

By Ronald A. Frank

Of the CW Staff

WHITE PLAINS, N.Y. — IBM has confirmed that its promised software support for 3705 users is at least six months behind schedule. And industry sources believe a communications-oriented minicomputer may soon be announced by the company.

The software that was not delivered was the level five release of IBM's Telecommunications Access Method (Tcam). Rather than being merely a refinement over earlier versions of Tcam, level five would have given 3705 users the

systems.

But delay in the Tcam software could have other implications for data users. IBM has never totally committed itself to moving teleprocessing software out of the mainframe and into the front-end 3705-type device.

The biggest internal IBM hesitancy would stem from the avowed IBM goal of concentrating as much power as possible within the mainframe. By definition the sophisticated data communications users are orienting their networks away from this concentration of DP resources and toward a more distributed processing approach.

### New Product?

The IBM answer to meet the needs of these users may lie in a new type of product — the communications-oriented minicomputer.

For some months now IBM salesmen have been proposing the System/7 in teleprocessing situations that would seem to be foreign to the S/7.

It was originally introduced as a factory-floor, control-type processor and is usually very expensive when proposed in competition with independent communications processors.

A communications-oriented mini would relieve the pressure on the 3705, and its smaller companion, the 3704, to get more free-standing teleprocessing power. It would allow these units to develop primarily as successors to the 270X series of line controllers, in support of large 370s.

IBM has traditionally moved slowly in the area of telecommunications. But it is being pressured to enter the free-standing communications processor area before the independents attract the data user with their lower-cost equipment which in several cases includes teleprocessing software far superior to IBM's efforts so far.

Only time will tell what IBM plans to do.

## Analysis

first implementation of the Network Control Program (NCP).

Level five was scheduled for March 1973, but an IBM spokesman said the new delivery date was "the end of the third quarter" of this year. Further software delay may arise since there are no Beta test sites yet for the promised software.

The NCP capability will mean that the 3705 can finally do more than emulate the earlier IBM 270X line controllers. The NCP software will allow users to move much of the communications control functions out of their mainframes and into the front end. Many independent suppliers of 3705-type systems are waiting for IBM's NCP so they can offer similar software.

Some observers believe there will never be NCP software for the 3705. These sources cite IBM's announcement of its Virtual Telecommunications Access Method (Vtam) as the logical alternative. The apparent reasoning for favoring Vtam is that it is more specifically oriented toward virtual

## First Data Service

## User Connects to N-Triple-C Network

By a CW Staff Writer

OMAHA, Neb. — When Gate City Steel Co. receives order-entry data at 2,400 bit/sec from its Chicago office the information is transmitted over unique common carrier facilities.

They are unique because the 4 kHz voice-grade channel at Gate City is the first to be supplied by Nebraska Consolidated Communications Corp., (N-Triple-C).

The data link from Gate City's Chicago office to the firm's corporate headquarters here went into service on May 25. It includes 16 towers that span the route, a terminal at the Kemper Building in Chicago and a terminal on the Woodman Tower Building which is described as Omaha's tallest building.

"We wanted to open this data network for some time," explained Bill Isgrig, DP manager for Gate City, "but we couldn't afford it with Ma Bell." Isgrig estimated that the N-Triple-C facilities are saving him about 40% compared with phone company rates.

A Bell 3002 line with C-2 conditioning would have cost about \$700/mo while his bill from the existing carrier will probably be about \$400/mo, Isgrig predicted. And

the specialized carrier service can operate without line conditioning.

But cost savings were not the only motivation. The specialized carrier has provided "superior service" and the technical people have been "very knowledgeable," Isgrig said.

The most serious line outage that has occurred on the Gate City channel was a disruption of service caused by a lightning strike, Isgrig said. The link went down about 4:45 p.m. and N-Triple-C engineers said they would restore service between 6:20 p.m., and 6:30 p.m. The line came back up at exactly 6:25 p.m., he said.

The data transmitted from Chicago is entered onto an IBM 3270 CRT. From the terminal, it is sent through an International Communications Corp. 2,400 bit/sec data set supplied and maintained by N-Triple-C.

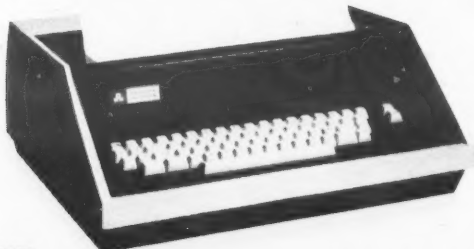
The lines between the specialized carrier's terminals and the Gate City sites are supplied by the local Bell company.

But from Gate City's standpoint there is only one bill to pay. The modem adds about \$55/mo for each unit to the monthly N-Triple-C charge but that includes maintenance. The carrier charges a flat fee of \$30/mo for each end of a local

loop and this cost applies within base rate areas from the N-Triple-C terminals that usually range from five to 10 miles. The fixed local loop rates are different from the Bell rates which are variable from company to company, according to an N-Triple-C spokesman.

One of the factors which made Isgrig decide on the new carrier is the flexibility available in the service. Gate City intends to add warehouse locations such as Davenport, Iowa, to its net and all expansions will be covered by the specialized carrier's flat rate of 80 cent/mi. compared with the sliding scale distance-dependent rates charged by Bell for private line facilities.

Gate City has a 370/135 at its Omaha headquarters. The system replaced a 360/25 early this year and the 370 is currently running under DOS with IBM's CICS software. The communications application runs under Btam and the transmissions from Chicago go directly into the CPU through the integrated communications attachment, Isgrig said. The ICA on the 135 allows Gate City to run communications without a separate line controller.



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## CW SPECIAL REPORT

# ★ Big Look at Small Systems ★

June 27, 1973

SPECIAL REPORT — Page 19

## He May Be Small but He Has Unique Needs, Problems

### Buying Turnkey Mini System Not Panacea

By John J. Morris  
Special to Computerworld

The low cost of the minicomputer and associated peripherals has enabled many companies to consider minicomputer systems for business applications. The acquisition and implementation of these systems has, however, consistently remained a major problem for the user who does not have the required technical expertise on his staff to implement the system.

At the outset the user is faced with several alternatives, ranging from the purchase of the hardware alone to the purchase of a full turnkey system (a total solution to the problem on a guaranteed performance basis).

The turnkey approach is the most viable alternative for the majority of potential users. It is not, however, a complete panacea, and there are several pitfalls inherent in the acquisition of this type of system.

If the acquisition process is correctly followed, it will provide for a legitimate bottom line comparison of all vendor proposals; result in the most cost-effective system; and quite likely avoid that still quite common occurrence called the "agonizing reappraisal."

#### Idea and System Concept

The first important step is for the idea and subsequent system concept to evolve. While this might appear self-evident and elementary to those who have arrived at this point through an evolutionary process, there are several users, due to the ever increasing variety of systems becoming available, who are presented with not the question of computerization in the broad sense, but basically "what type?"

Is there a real on-line requirement, will a batch-type system do, do I need a disk or ledger-card system, what is economical to implement, what are the cost factors involved, are all questions that must be resolved due to their significant impact on the cost-effectiveness of the overall system.

Vendor discussions initiated prior to some definition of system requirements will generally result in an inordinate amount of wasted time, confusion and possibly a life-time study. The situation might be likened to looking for a Mercedes in a VW showroom. Through a process of planned self-education or the use of accounting or consulting firms, this step can be minimized.

A brief general description of system requirements should be prepared for all potential vendors. This should include the following elements.

- The objective of the system
- Functions to be automated along with a brief description
- Parameters of the business (number of customers, orders, inventory items,

*New equipment and decreasing prices have made DP feasible for many smaller businesses. But small business have unique needs, small budgets and often no technical in-house staff.*

*This special report will examine some of the problems involved in selecting and installing the right equipment and implementing it and how some users have managed to implement small DP systems*

etc.)

- General information such as present mode of implementation, relation to corporate activity, schedule constraints, etc.

#### Compiling the Bidder List

When searching for a vendor, there is a tendency to include everyone rather than go through a preliminary elimination process. This could lead to mass confusion or a great deal of unnecessary effort in dealing with the vendor representatives. It is suggested that the final compilation include no more than 10 to 12 vendors.

Send the selected vendors the system description, requesting additional data that will completely validate the vendor as one you will eventually do business with. Each specific situation will dictate the nature of this additional information. For example, a user considering a multiple unit purchase for installation in different sections of the country will, of necessity, consider maintenance a major factor in the decision-making process.

In general, this additional data should include a request for financial data, number of similar systems installed, length of time installed, person to contact, maintenance capability, warranties and terms of

purchase or lease.

This process should enable the user to narrow down the field to three to five qualified bidders to which the request for quote (RFQ) is sent for formal quotation.

The request for quote is the most important step in the process and is generally the most difficult for the small user to accomplish. Assistance is generally required from an accounting or consulting firm.

The document may be looked at as the functional specification for the system and therefore should completely define all the functional requirements of the system and exhibit all the transaction data to be handled by the system.

In defining the functional requirements, the greatest problem faced by the user is where to make the trade-offs to obtain the most cost-effective system. It is common and easy to incorporate all possible functions and to have the system do "everything."

In many cases a well-defined system (all tradeoffs made) will accomplish 90% or more of the intended objectives at less than 50% of the total system cost. Secondly, it must be realized that the RFQ is the vehicle for the vendor to provide a

(Continued on Page 23)

### S/3 Limitation Is Functional Not Physical

By Stanley J. Cloward  
Special to Computerworld

Where and in what way does one begin to encounter the shortcomings of the IBM System 3. The S/3/10 has by now proven itself a reliable little workhorse. Initially released as an 8K, card-oriented system which leased for about \$1,200/mo, users soon found that for a relatively small increase in rental, they could enjoy the inherent advantages of disk operations.

Additional hardware enhancements followed in rather dramatic fashion as market penetration exceeded IBM's fondest dreams. (The present installed base of S/3 is around the 15,000 mark).

The specially tailored RPG-II language, released simultaneously with the hardware — and in fully functional condition — has also been enhanced to the point where most user needs can be met with relative ease, especially in a small shop. The System Control Program (IBM's name for the small Operating System, or Monitor), now in its eighth release, has been brought along a surprisingly consistent path of functional modifications with very few "glitches"

(Continued on Page 20)

### Part of an Insurance Program

## Big-Time Security Analysis Needed

By Robert V. Jacobson  
Special to Computerworld

The small businessman who has just installed a minicomputer system may begin to wonder if he should concern himself with DP security. After all why should anyone plant a bomb in his office?

If that were the only worry, he probably would be right to dismiss security as a concern. But, in fact, he is exposed to many of the same problems as the large bank or insurance company and has a special problem the giants don't have.

The big installation makes use of its large staff to support a number of key security measures. Separation of duties, a standard internal controls technique, is used to help detect and correct errors and to deter fraud.

Cross training and depth of staffing at a large site reduce dependence on the knowhow of individuals. Ample personnel are available for assignment to emergency duties; fire fighting, loss control, evacuation and the like.

The small installation with perhaps only four or five people operating the DP function will be hard-pressed to duplicate these measures.

No matter how small the DP operation, it should undergo exactly the same kind of security analysis as a multimillion dollar computer center. Some basic guide-

lines are:

- Examine each computer application to see if it is a potential target for fraud or theft of assets, or if a delay in performing the application would be damaging. Estimate the potential dollar exposure from losses or delays.

- Think of all the things that could go wrong; fire, flood, riot, labor disputes, power failure, theft, air conditioning failure, sabotage (perhaps by a disgruntled employee), and estimate the probability of occurrence of each.

- Combine the two estimates to find out which are the most significant threats — the one most likely to cause a large dollar loss and which applications particularly need protection.

This risk analysis is not easy to do. It requires substantial effort but the output is invaluable for two reasons. It pinpoints what needs protection and helps the manager decide what is a reasonable amount to spend on protection. Without a risk analysis, one can only guess at what to do and the chances are that the security program will be less than optimum.

A wide range of remedial measures have been adopted by prudent DP managers, and the businessman with a small computer system will probably find many of them helpful.

These include internal controls, a workable contingency plan to include backup, fire detectors and a burglar alarm, and hand extinguishers (train several employees to use them effectively.)

Be sure others in the organization receive continuing training in operating the hardware.

Most important, keep yourself involved. Make the effort to understand what's going on in data processing.

In the vast majority of cases, the DP manager will be doing his job to the best of his ability. But unfortunately a number of businesses have been defrauded by trusted DP staff members.

Every businessman should keep two points in mind:

- Most frauds are discovered by chance or through a foolish blunder by the embezzler.

- We have no idea how many frauds have never been discovered.

While secure and reliable DP operations will require some effort by management, it need not be a huge or costly burden. Rather, a well-balanced security program can be thought of as part of an insurance program to protect company assets and the viability of the business.

Jacobson is vice-president of the Sentor Security Group, Inc., New York, N.Y.



# Decentralized Minis Are Option To On-Line Terminal Systems

JAMESTOWN, N.Y. — "Any factory that can afford hiring one more part-time clerk," said Roger Horsfield, DP manager for AVM Corp., "can afford to computerize its inventory and production control system."

"We are doing just that with a number of our smaller factories. We are providing them with the systems they need for their own operations. This includes the hardware that can operate those systems completely independent from our DP operation."

"And it is being done without any technical personnel. The whole package is costing each installation about as much as it would cost to hire another clerk-typist."

The program, Horsfield said, is one of decentralizing the computer operations by providing each of the company's autonomous divisions with its own minicomputer, along with the systems required to operate independently of the head-quarter's DP department.

AVM, is comprised of a group of 14 divisions and small companies operating independently of the others. Although they are nearly all involved in some type of assembly and fabrication

processing, most of their end products — ranging from automatic voting machines manufactured by the parent company to such other products as office furniture, hospital cabinetry and retail store fixtures — are unrelated.

Each of these divisions operates a small-to-medium-sized plant, typically with between 200 and 300 employees. Average sales range from \$4 to \$10 million.

Each division is also fairly autonomous.

## DP History

The company's DP department, under Horsfield's direction, began operating late in 1970 with the installation of an NCR Century 100 computer, upgraded later to a medium-size NCR Century 200 with a 32K-byte memory. Operating primarily in accounting functions, this installation provided little or no direct support to the company's widespread divisions.

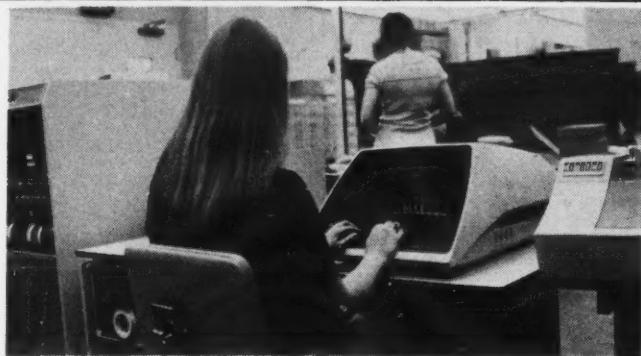
"Still, there was an obvious need for automation on the division level," Horsfield said. "In a typical small factory, the production scheduling and management of materials and inventory

are under the direction of one man. He has the problem of scheduling the subassembly and assembly of several hundred parts and components through various production centers with widely varied capacities. It is the type of job that benefits from automation."

Two courses of action were open, Horsfield decided: centralize the operation with the distant factories going directly on-line with the Jamestown office, or completely decentralize, with each plant using its own computer operation if an economical means of doing it could be found.

To centralize the operation would have required major expenditures. First, Horsfield said, the company would have had to upgrade the present central computer by at least \$4,000/mo. Then it would have had to install terminals at about \$700/mo for each plant. In addition, there was the added communications expense of long distance tolls or Wats line service.

The decision was made to decentralize, installing Digital Equipment Corp. Datasystem



Non-technical operators enter data into DEC business-oriented minicomputer system, which AVM Corp. placed in each of its autonomous factories.

330 business-oriented minicomputers in each of the plants.

The decision to decentralize was also based upon the ability to operate the small units without adding technical personnel to the factories' staffs.

"We wanted to destroy the DP mystique," Horsfield said. "We wanted to make the computer a working tool, and put it where the man using it is working, and where he can operate it himself, rather than making him come to some distant operation that he can neither see nor understand."

In the DEC Datasystem 330 minis being used, the central processor is concealed in the desk-size cabinetry that holds the operator's console and tape drives. "The fact that the processor is concealed," says Hors-

field, "helps us in our efforts to have nontechnical people operating the machines; it helps eliminate some of the awesome qualities of a computer that tend to frighten away the lay user."

The operator's console is equipped with standard alphanumeric keyboard by which the operator may relay program instructions, ask questions of the computer or input data. A CRT provides a visual check of keyboard input as well as display of computer output. Disks, tapes and a line printer round out the equipment.

"In terms of price/performance," he said, "this [decentralization] is, without a doubt, the most economical way we could go."

## S/3 Limitation Functional, Not Physical

(Continued from Page 19)

along the way.

Most users I know say the "up-time" performance of the S/3 has also exceeded IBM's expectations.

The S/3 is physically enhanceable to a remarkable degree for a small machine; core storage can be brought to 64K under special arrangements; disk storage can be enhanced to a total of roughly 40 bytes; a maximum of four tape drives in 20, 40 and 80k bit/sec transfer rates may be attached; printer speeds of 100-, 200-, 300-, 600- and 1100 line/min are available.

The real limitation appears to be, therefore, functional rather than physical. With the existing machines, there exists no true multiprogramming capability. As a tradeoff, IBM offers what is known as the Dual Programming Feature (DPF) under which core is divided into a maximum of two partitions, each with a unique set of hardware registers.

Using the DPF and a special software package known as Communications Control Program (CCP), it is possible to assign to each partition a tele-

processing program and a batch program or, more simply, two batch program streams.

A further limitation of the S/3 is the lack of an interactive language which can support multiple remote access arrangements for teletypewriters or other devices.

The above limitations pose a rather severe dilemma for the user contemplating substantial growth and the development of a data-base management capability.

One's initial reaction is, of course, to look within the IBM stable for the next logical successor machine.

The drawback, however, is the dramatic cost differential between the S/3 and IBM's "paper machine," the 370/115, which rents for roughly twice the price, and an "actual machine," the 370/125, which again rents for twice the price of a 115. In short, a user who finds himself with a loaded-down S/3 is in a real bind.

What are the alternatives if a user is so bold as to consider crawling out from under the

large grey umbrella (IBM's)? We have reviewed the stables of other vendors and found them to be somewhat lacking.

Our decision, at least for the immediate future, is to stay with our S/3, move to more shifts of operation and wait until "big daddy" announces the next round of enhancements to the S/3 (such as interactive computing which is rumored to be available soon with a maximum of 32 remote devices). During the interim, our costs will steadily mount to the point where it will be much easier to cost-justify the 370/115.

Then again, it just might be possible that within a relatively short time, IBM or some other vendor will decide to make its medium-scale machines more cost-competitive — and thus reap a fortune — while easing the transitional pains of those of us with large and growing processing requirements who are at present left to stand first on one foot and then the other.

Stanley J. Cloward is director of computing services at Baldwin-Wallace College, Berea, Ohio.

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## Establish Choice of Operation

## Vendors Rated on Points

## Objectivity Must Rule Any Vendor Evaluation Method

By Alvin Alosi

Special to Computerworld

When the potential new user has progressed through the decision-making process to the point where he is ready to select a computer vendor, he needs to carefully establish the criteria on which he will base his judgment.

He needs a sound set of ground rules to help guide him through all the claims and counterclaims that will be presented to him through the various sales representatives.

To go through the selection process properly, he needs to prepare himself to be as objective as he can and to eliminate as much as possible any prejudices he might have regarding brand-name popularity.

The new user faced with this decision may find the following methodology helpful.

As a prospective new user, our company had already established certain para-

eters. First, we compiled an accurate fix on not only our current volumes but expected future volumes as well. In this way, such things as storage requirements and peripheral capacities could be more accurately determined.

Second, we had established a preference as to our method of operation. In our case, we had decided on using CRTs in a conversational order entry process with multiple task capability instead of single batch operation.

Thirdly, we had established an equipment cost range we wanted to stay within.

With these beginning parameters, we set about the job of interviewing vendors. A worksheet was set up showing in the left-hand column the list of factors we wanted to use in our comparison; a column to the right was set up for each vendor interviewed.

The factors listed were:

- Core requirements — to handle all

jobs in a multijob environment (expandability, size increments).

- Multiprogramming capabilities. Is multitask operation possible? How many jobs? How much will background jobs degrade the system?

- Disk capacity. Was pack removable or combination of fixed and removable? How many drives can the system support without a major upgrade? What are access times? Convenience in changing packs.

- Printer speeds. How fast is printer recommended by the vendor? Are faster printers available? Number of columns; special characters; ease of loading paper or forms. Can it produce the number of copies required with clarity?

- Input device. (We were looking for paper tape input for batch work because of its compatibility with flexowriters, add punches, etc.) How fast can it read (in both roll and fanfold modes)? Does it have an automatic take-up reel for long tapes?

- Are CRTs available from vendor as input devices? What are screen capacities? Transfer rate? Does it have a 10-key numeric cluster convenience?

- Software. What programming languages are available? What type of utility routines are available, i.e. sorts, copies, backup procedures, file displays and file maintenance? Programming diagnostic and debugging aids? Applications packages, i.e., payroll, accounts receivable, general ledger? What are charges for same? Will software revisions be necessary as a result of any future upgrading of equipment?

- Software training and support.

- Delivery schedules. Get firm delivery dates on all pieces in configuration. What kind of track record does vendor have in meeting delivery promises (contact existing users)?

- Physical requirements for site preparation. Special air conditioning? Electrical wiring? Special flooring?

- Expandability. How much can core be expanded? How many disk drives and what storage capacity can the system support? If a multitask operation, what is maximum number of concurrent operations? What additional peripheral devices will the system support? What is involved in adding peripherals, i.e., is major downtime necessary to upgrade the system?

- Does the system have telecommunications capability? What data transmission devices are available? Can this system be linked to a system of a different manufacturer?

- What are internal processing speeds?

- What are various types of financing arrangements available? One-year, three-year, five-year rental plans? When does billing begin? Options for changing from one plan to another in subsequent periods? Penalties involved in changing financial arrangements or in an outright cancellation of agreement? Policies regarding substitution or upgrading of equipment?

- Total cost of the system proposed. This can be the total purchase price of all equipment quoted in addition to some selected financing plan such as one-year, three-year and five-year monthly rental cost.

Each of the vendors interviewed was given the same basic parameters. They were given the volumes, the type of operations we wanted to perform, the method we wanted to use (CRT input media) and the same general monthly cost range we wanted to stay within.

They were asked to come up with the best combination of equipment to handle the volumes and systems required within the cost framework provided. They were also required to furnish information regarding each of the factors outlined.

A total of 10 different computer vendors was interviewed in this manner, and, as a result, the evaluation worksheet provided an excellent basis for comparing each vendor feature for feature.

For example, one vendor might have to list a 200 line/min printers to stay within the cost limitations whereas another vendor could list a faster printer and still meet the cost requirements.

This evaluation method could be further refined by assigning a scale of values for each factor involved giving higher values for the more important factors and then grading each of the vendors on that scale.

It would then be possible to add up the total "points" scored by each vendor and this score used in combination with the total cost could produce a cost/performance factor for each vendor.

By studying the completed worksheet, the field could be narrowed down to the one or two vendors offering the most for the least price, and direct communication with current users could be used to aid in the final analysis.

Alosi is comptroller at Food Enterprises, Inc., Canton, Mass.



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## Turnkey Systems Not Panacea

(Continued from Page 19)

fixed price quote for the total system. If there is an understatement of the problem, there will have to cost adjustments in the price of the system or deletions of requirements.

Either type of adjustment is not easy to face when the system development is well down the road, and almost always results in a higher overall system cost. The result of an overstatement of the problem, while not quite so common, is obvious: a higher cost with no functional value.

The development of the RFQ is further complicated by the increasing availability of packaged systems. Experience has shown that for certain functional areas such as accounts receivable, the utilization of a package would prove satisfactory.

On the other hand, the utilization of a functional order entry or inventory control package will rarely fulfill all the requirements of a specific business. Package systems that have a spe-

cific industry orientation have a much better chance of meeting the requirements but even here caution is the byword.

### Reference Checking

While it is possible to use a vendor reference list to call users of previously installed systems and obtain a good feel for the vendors' capabilities, it is advisable to visit at least one installation to see the system in operation. In calling references or visiting sites, the following check list will prove helpful in assessing the vendors' capabilities.

- Determine general level of satisfaction.
- Was the installation on time?
- How long installed?
- Any major difficulties during installation?
- Reliability of the system to date.
- Has the service level been adequate?
- Was the system a full turnkey system?
- Determine scope and/or complexity of the installed system.

A note of caution: vendor referrals do not include unhappy clients if there are any and there generally are. Further, the users do not wish to admit to problems with the system. If you can find clients that are not on the vendor referral list, by all means give them a call.

### Best Man for the Job

The first and most important criteria in vendor selection is the evaluation of the overall capability to do the best job. In this part of the evaluation the sales-

man's claims should be forgotten and one must rely on the concrete data gathered, past performance of the vendor and the evaluation of the people who you will be working with in the development of the system.

The acquisition of a turnkey system is quite different than the acquisition of hardware alone and the evaluation process must be based primarily on a systems and people evaluation as opposed to a hardware evaluation. Most vendors will in many cases be using basically the same hardware elements.

In general, the process, being a competitive one, will cause the vendors to come in with their best prices. Do not be surprised, however, to find wide variations in the total system price. This will be due to the vendor's proposed implementation, experience factor, skill of his programmers and to a great extent the capability of the vendor's operating system, which can significantly effect the hardware configuration.

In any analysis evaluating the worth of the system, the measure of the system should be on total cost vs. benefits. Quite frequently, the cost of the system alone is used in this analysis and such items as programming budget (there will always be changes and/or additions), cost of supplies and allocation for dedicated personnel are overlooked in the analysis.

*John Morris is an independent consultant specializing in mini-computers for business applications.*

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### Computer Voting... Almost

CENTRALIA, Wash. — Centralia High School students gained valuable experience in computer voting procedures recently when they voted by punch cards for student body officers.

The new method will be used in all Lewis County elections from now on.

But the ballots, which in a normal election would be tabulated by a computer, were hand-counted by school officials.

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# Should Small Businesses Consider Minis? Yes, but...

By Michael Weinstein  
Of the CW Staff

Should small businesses add the names of minicomputer manufacturers to the list of potential computer suppliers?

The answer appears to be a slightly qualified "yes" with the qualification being the internal computer competence of the user.

The combination of a small budget and lack of knowledge of computer operations (typical of small businesses) has promoted the concept of "turnkey systems." These require little user knowledge as they come with all hardware and software required to perform the user's recognizable business tasks.

The turnkey approach is historically opposed to the mini builders, who are typically as the usually technical hardware experts concerned with building faster and less expensive processors, according to George Shapiro, manager of applied systems marketing at Hewlett-Packard.

The stance of the builders through the 1960s was to build better hardware and operating software and sell these either to engineers or turnkey builders who added the ingredients needed to perform a specific task, he said.

Ed Marinaro, manager of business data products at Digital Equipment Corp., said the arguments used to dissuade the small user from considering the minimakers were:

- They don't understand the problems of the small business.
- They are loath to write individual application software.
- They are unable to provide sufficient local software or hardware service personnel.

But as minicomputers have grown they have naturally incorporated new techniques to make the systems more adaptable to small user applications.

One such trend is the higher level lan-

guages, such as Fortran, Basic and Algol. This move away from machine language means that the user is not faced with the option of machine language or packed software, according to Steve Goal, manager of marketing support at Data General.

The inclusion of the higher level languages means the user has tools to write his own programs. Even in the most popular small business systems — IBM's System/3 — users write most of their programs in a higher level language (RPG).

A second improvement was the addition of diverse peripherals and the system upgrade potential.

The minimakers have never been enamored with cards and have worked to eliminate this form of entry. The expanded use of disks, tapes and micro-coding has led to more efficient machine use.

These and other system capabilities have brought the minicomputer to the point where it provides all the tools by which the user can directly build his own capability. But for the most part it is still left to the user to build the actual system he will operate.

So a user effectively trades low entry cost and system expandability against support and canned packages by turning to the mini.

The lower cost entry cost is self evident: a central processor and specified peripherals costs less from the minicomputer company than from the large mainframe makers.

The ability to expand the system is not so evident.

A user can obtain a simplified starting system with 8K bytes of main memory, for example, from the minimakers and expand both the memory and peripherals far beyond standard systems options without having to upgrade to another system as his System/3 cousin would.

If users can get started for less money, expand to greater capabilities with minicomputers, then why aren't minis causing a greater impact on the IBM System/3, NCR 50-type customer base?

The answer may be fear of inadequate service and commitment if the small user leaves a large user-oriented vendor.

Part of this fear is understandable as a System/3 user has access to a large library of programs and various organizations that will help him solve problems. Further, IBM for example, has a large field support staff that is usually near at hand and responsive.

The minicomputer makers on the other hand, have a more technically-oriented — as opposed to general applications-oriented — staff that is spread more thinly across the country.

The mini builders also have an internal

problem. If they decide to go after the business of providing systems directly to the small business user they go around one of their best customer bases — the OEM buyers who build turnkey systems.

Will the minimakers decide to build end-user forces and end-user support organizations?

If we judge activity over the past few years the answer is a qualified yes. There are four million small businesses in the U.S., and the amenities aside, that represents too large a market to ignore, according to George Vosatka, president of Varian Data Machines.

For the user, right now, if he has an internal computer expertise and can take a major responsibility for generating his own application systems, the minimaker provides these same ingredients at costs markedly less than the traditional sources.

## Bakers Take a Fresh Approach

LOS ANGELES — An overabundance of day-old bakery goods may be a bargain for some people, but to the baker they mean trouble. Van de Kamp's Holland Dutch Bakers has solved this "stale" problem with some "fresh" ideas from the computer.

Van de Kamp's, a division of General Host Corp., produces more than 100 varieties of bakery products, ice cream and candies for sale through 825 retail outlets in the Western U.S. And keeping the shelves stocked with fresh products is a critical job for the company, according to Thomas R. Sheehan, director of management systems.

"We process thousands of daily orders from each store to notify the bakery of production needs and also keep track of accounts and billings," Sheehan explained. "Prior to 1972 we recorded this

information with punched cards, but it was too slow and costly. We looked to the newer computer technologies for a better method."

Now, each Van de Kamp's order is entered into a Computer Machinery Corp. CMC 5 key-to-disk system. Order information from the field, including various types and sizes of bread, rolls, coffee-cakes, pies, cookies, doughnuts, candy and ice cream, two sales prices (regular and day-old) and returns for unsold products, is keyed into the CMC 5's minicomputer which prepares data for processing by Van de Kamp's central IBM 360/30.

Sheehan claimed the key-to-disk system has resulted in faster response time, more rapid data turnaround, reduced operating costs, improved personnel management and an order trend analysis system.

# Who can sell computers in Japan?

## Shukan.

In Japanese it's called *Shukan Computer*, and in English, it means "Computer Weekly." Whatever you call it, *Computerworld's* new sister publication is an excellent vehicle for selling EDP products and services in the large and expanding Japanese EDP market. Here are some of the reasons why:

• **Shukan Computer** is a joint venture of *Computerworld* and Dempa Publications, the leading Japanese publisher of electronics information services. With the combined resources of the two companies, *Shukan* has the largest news gathering organization of its kind in the world.

• **Shukan Computer** is the only newsweekly for the fast-growing Japanese computer community.

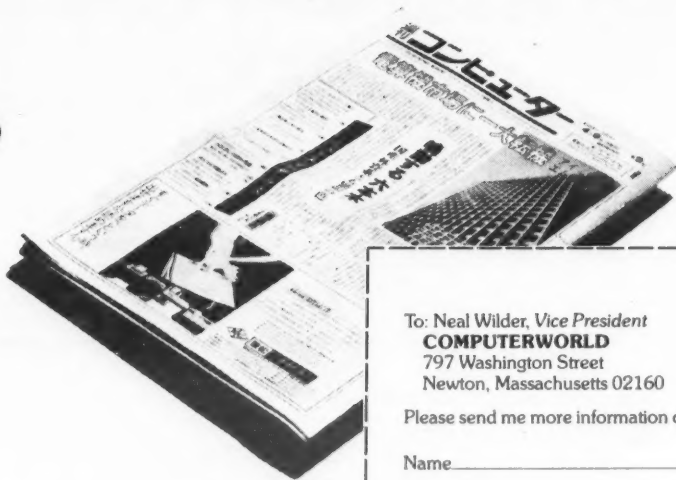
• Initial circulation is guaranteed at 35,000, divided about 80% to end-users and 20% to the computer industry. Circulation development methods currently under way are the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years.

• **Shukan** lets you in on the action in the world's fastest growing EDP market. The Japanese Ministry of International Trade and Industry (MITI) has made the following 1976 forecast: 39,000 general-purpose systems installed, up from 11,237 in 1971; 11,000 minicomputers installed, up from 1,670 in 1971; and 3,000 industrial systems installed, up from 1,086 in 1971.

• Is this growth likely? The latest census of general-purpose systems revealed that there were 14,806 systems installed as of September 1972, a one-year gain of 3,569 units and \$911 million installed value, a growth of 31.7% and 23.1% respectively. And more than 50% of these new systems were American made.

• It is true that there are import restrictions. But Japanese vendors and users can get permission to import almost anything they want and need. As a result, 1972 imports were over \$360 million.

• Advertising in *Shukan* is easy. With *Computerworld* representatives across the U.S. to assist you, it's easy to place space in *Shukan*. For a small fee, we can translate and type-set your ad from English to Japanese. To get more facts, just send in the coupon.



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## Bits & Pieces

### System 10 Disk Replacement Costs Less Than DEC RP03

MARINA DEL REY — The Ampex DM-323 is a double-density disk drive which can save DEC System 10 users up to 40% over the DEC RP03 drive, according to a spokesman for Ampex Corp.

Each DM-323 drive stores 10M 36-bit words on a standard RP02 pack with 400 usable cylinders.

The Ampex drives are available tentatively on a two-year lease plan for \$555/mo including maintenance from 13031 W. Jefferson Blvd., 90291.

### SCM Builds Its First Printer

DEERFIELD, Ill. — SCM Corp. has introduced a line printer as the first in a series of commercial products directed at the computer user, according to a spokesman for the firm's Kleinschmidt Division.

The 7360 prints 136 character lines at a 600 line/min rate. Single unit price is \$9,500 with maintenance provided by SCM service centers throughout the U.S. Volume discounts are also available from Lake Cook Road, 60015.

### Telex Gets IBM OK for 145 Add-On

TULSA, Okla. — Telex has announced approval by IBM for the attachment of the Telex 6345 semiconductor memory system on the 370/145.

### Nova Users Offered Floppy Disks

BEDFORD, Mass. — Nova Series users can obtain an interface that permits direct attachment of a floppy disk system to their minicomputer.

The Innovex Corp. interface is mounted in the diskette formatter cabinet and costs \$200. A single card and single formatter will handle up to eight diskette drives.

A complete diskette memory system — including interface, drive, seek card, formatter and power supply — costs \$2,740 from Four Alfred Circle, 01730.

### Controllers Made for X-Y Tables

SMITHTOWN, N.Y. — The Anorad auto-controllers are integrated systems for automatic control of X-Y tables.

The accuracy range is .00005 in. up to .0010 in., according to a spokesman for Anorad. Speeds reach 100,000 increment/sec, he added.

Controllers for two axes are priced from \$5,000 to \$7,000. Complete systems including X-Y tables — for 5 in. by 5 in. travel — are priced from \$12,000 to \$18,000 from 225 Engineers Road, 11787.

### Correction

The Centronics Model 308 matrix printer with keyboard [CW, June 13] is a 120 char./sec device leasing for \$161.40/mo on a one-year lease.

## Prudential Is Pleased

# 'COM Beats Line Printer by 20 to 1'

By Michael Weinstein  
Of the CW Staff

BOSTON — "When we first started using computer output microfilm (COM), our user departments were constantly hassling us to justify putting their output on microfiche. But as time passed, COM has been so successful that users now demand justification for any application that does not use COM as the output media," related Henry Creutz, systems analyst at Prudential Insurance Co. here.

Prudential first used COM in limited applications such as payroll history registers, dividend information and other general business applications.

These applications involved producing magnetic tapes between 12 midnight and 4 a.m. which were given to an outside service bureau which then returned the finished fiche before the start of the same working day at 8 a.m.

Even in these early applications the benefits of COM were marked, Creutz said, as it was 20 times faster to produce the tapes than print the output on a 1,000 line/min printer.

### More Advantages

Another advantage cited was that with the printer multiple copies required re-printing the specified document. "Using COM all we needed was a duplicator; and as this duplication was done totally off-line it did not impact our 370/155 in any way," Creutz said.

Microfiche also saved "incalculable storage area" and made data more accessible.

Prudential wrote its own software package that provided for a title image on each fiche. Thus, Creutz said, a user could view this image to find the contents of any of the 207 data pages contained on each fiche.

The Prudential software also labeled each fiche with title information such as name of report, date produced and fiche number.

This labeling allowed the numerous departments getting their output from the computer department to easily determine what the specified report was and where it was located, he added.

The ease of use coupled with a 95% reduction in computer time needed to produce standard reports led to an increased demand from the user departments to have their reports in COM.

This increased demand meant that Prudential either had to start using additional service bureaus or develop an in-house capability.

The decision to move in-house was made because it was considered important to have immediate communications between the computer department and the COM producer.

Using a service bureau just added another level of administration to the mix and made it harder to handle the exceptions such as a last minute change or request for duplicates, Creutz said.

On the other side, using a service bureau in the beginning was a good idea since it made the individuals familiar with the operation and confident that they could incorporate the practice into the internal operations, he added.

The decision was made to continue to use fiche instead of roll film since over three years the only repairs needed to the 47 3M Consort viewers at Prudential had been the replacement of three light bulbs.

"We were concerned that with roll film we would introduce electric motors and more complex reading equipment which might increase the maintenance load," Creutz noted. It is hard to beat a system that had only required a few dollars' maintenance over its entire life, he explained.

The actual COM unit obtained is a Quantor 105 which, Creutz said, was producing output only one hour after it had been wheeled in the door and the power turned on.

The Quantor system is used off-line and Creutz intends to keep it that way as he feels to interface directly would degrade computer operations by stealing excessive time. The tapes are still faster than any other medium for getting the information out of the system.

Using the new internal COM unit "we are producing between 300,000 and 400,000 frame/mo. The production of these fiche requires about 1-1/2 hr/day. If the same job were performed using conventional line printers it would take about 30 hr/day on one printer," he continued.

Combining the added potential of the COM unit with the increased demand among other user departments within Prudential, Creutz estimated production should be up to about one million frames a month by the end of the year.

This will be accomplished at the base cost of about \$3,000/mo which includes maintenance from NCR and a duplicator, he said.

"I can not even estimate what a million pages per month of printer-generated output would cost in computer time alone, much less the savings in terms of turn-around time, the ability to duplicate faster, the freeing of storage space," Creutz concluded.

## Equivalent to Ascii

# OCR-A Standard Adds 11 Symbols

Special to Computerworld

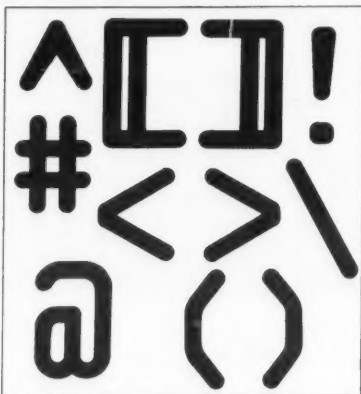
WASHINGTON, D.C. — The OCR-A standard, recently improved to include lower-case letters, will have 11 symbols added bringing it up to the Ascii code. The new characters include three different sets of paired characters (braces, brackets and greater-than and less-than), a reverse slant, exclamation point, number sign, ampersand character and a new

"upward arrowhead."

The upward arrowhead replaces an equivalent sign previously called the circumflex. Discussions in the ANSI X3A1 Committee recently rejected the use of the circumflex in favor of the alternative upward arrowhead sign, which, it was pointed out, can be used for the language-dependent circumflex where appropriate and also for other symbols in other positions.

Some changes in nomenclature are also included in the current suggestions. These involve dropping the phrases "left and right parenthesis" in favor of "opening and closing brace." Also, the assignment of the graphic shapes, fork, chair and hook, to represent the non-OCR-A/Ascii code table symbols — underline, grave accent and tilde.

Filling in of some of the new characters, such as the number sign, the ampersand and the opening or closing brackets, was recognized as ambiguous, but the suggested standard states that such filling which can occur on various types of printing equipment would not be regarded as making the characters concerned non-conforming.



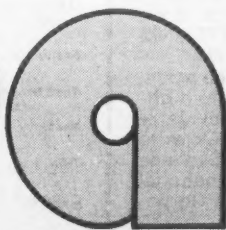
These are the 11 new characters.

## 1403 Printer Interface For B3500 Users

SANTA MONICA, Calif. — Burroughs B3500 users can attach an IBM 1403 printer to their systems using the Spur 1403 controller with a B3500 interface. Both controller and interface are available from Spur Products Corp.

The controller with interface sells for \$12,686 from 2928 Santa Monica Blvd. 90404.

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## HAL's Great-Grandfather?

# Computer Speaks in 12 Languages

By Michael Weinstein  
Of the CW Staff

NEW YORK — Viewers of Stanley Kubrick's movie "A Space Odyssey — 2001 A.D." may remember the talking computer "HAL."

In choosing 2001 as a time when HAL would reach maturity Kubrick might have been overly conservative, if one considers a demonstration recently conducted here by Univac.

The Univac demonstration, which has no immediate consumer applications, illustrated computer-voice applications via a Touch-Tone telephone hookup to a Univac 1616 computer at the firm's Interactive Speech Research Facility in St. Paul, Minn.

### UN Approach

Individuals were allowed to call the computer for computer-generated messages in 12 languages, including Mandarin

Chinese, classical and modern Greek, Hebrew, and Urdu, the language of West Pakistan.

"Our present system is capable of up to 24 minutes of non-repetitive English

## Looking Ahead

speech," Dr. Carl Hammer, director of computer sciences, noted.

"It uses an average of 120 word/min. The system can also speak 400 words in each of six foreign languages," he added.

The Univac system can recognize both multisyllabic words, spoken individually, or short sentences, commands and mathematical expressions. It can then generate words in the proper sequence for output communications with a human listener.

The system recognizes words by such factors as number of syllables and initial and final sounds. Speech waveforms, containing all sounds, are digitized and stored in the 1616's mass memory. They can be reconverted to analog form, played back or displayed on a graphic terminal.

In the voice response system demonstrated, the computer assembles complete prerecorded words in the right sequence for playback.

Future computers are expected to actually assemble and speak words from individual sounds stored in main memory.

"Though HAL has actually been here for some time for simple recorded messages, he will become a better conversationalist, providing such information as current stock quotations, credit card verification, guidance for customers or students and up-to-the-minute weather reports," Hammer stated.

## Bits & Pieces

### Key-to-Cassette Designed For Off-Line Data Entry

SEATTLE — The Datacumulator is a key-to-cassette, desk-top device with numeric or alphanumeric display and 10-key or typewriter-style keyboard available from Keywrite Corp.

It has a 60-character buffer memory which is displayed 12 digits (or 30 alpha characters) at a time. Information in the buffer can be reviewed and edited before recording on a standard Philips-type cassette. Information is coded in either six- or eight-bit Ascii.

Base price of the numeric Datacumulator is \$1,500 from 1200 N. 107th St., 98133.

### Winders for Paper, Mylar Users

HUNTINGTON, N.Y. — The 205P motorized winders from Computer Accessories Corp. are designed for unattended processing of paper or mylar control tapes.

The series performs winding or unwinding operations at 30 char./sec.

Prices range from \$169 to \$200 depending on options from 211 New York Ave., 11743.

### Tapewinder Hand-Held

HANOVER, N.H. — Paper tape users can obtain a hand-held electric tape winder from Logic Associates, Inc.

The unit winds a 4-in. roll of paper tape in 5 sec. The winding reel plus electric motor costs \$42.50 from 3 Lebanon St., 03755.



## Reely!

For \$2.75 each, paper tape users can obtain plastic reels for winding and storing tapes from Dataperf, Inc., P.O. Box 574A, Stony Brook, N.Y., 11790.



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# Staff Training Options Grow; End-User Support Lags

By Frances D. Smyth

Special to Computerworld

With every major technological advance comes an immediate need for education. This need is all too often filled partially and haphazardly until adequate materials and classes can be developed. When the technology refuses to wait for the education to catch up, the problems of technical training are persistent, even chronic.

Continued change in data processing has left both DP personnel and user department personnel in need of better, more convenient education. Manufacturers, universities, private computer schools, professional societies, education technology companies — all have attempted to provide needed services and materials.

Yet, today user personnel education has barely begun and DP personnel are often untrained for the challenges of their positions. Given the recent economic crunch, DP departments can no longer accept the current environment as workable and must critically examine available education with a view to revising and improving it.

## Marketing Extension

Computer manufacturers were among the first groups to get involved in education, and it was and still is an extension of the marketing effort. That doesn't mean that the education is poor — it can be excellent. But, especially in introductory classes, a real effort must be made to separate salesmanship from teaching.

Another problem has arisen from IBM's unbundling. DP managers have been reluctant to pay for programmer training courses. Therefore, an even heavier reliance than previously existed has been placed on programmed instruction material.

In my opinion, this represents a fair approach to education, but students using it do not generally retain information as well as those taught in a conversational manner via a mixed-media approach.

For the intermediate or advanced person, computer manufacturers do a much better job. In fact, they are the best source for in-depth technical training on their particular hardware or software offerings.

## Structured Program Ideas to Be Taught

CW West Coast Bureau

SANTA CRUZ, Calif. — A series of intensive short courses in computer sciences has been scheduled at the University of California here from June 25 to Aug. 24.

On the schedule is a two-week course entitled "Advanced Programming," in which students will have the chance to apply the concepts of structured programming.

The course will be run from July 23 to Aug. 3 and will be taught by Dr. C.A.R. Hoare.

A one-week course on "Computer Statistics Packages" will be taught from Aug. 6-10 by Dennie L. Van Tassel for scientists, researchers and analysts in social, biological and medical sciences who need a detailed knowledge of the use of SPSS and BMD statistical packages.

Other courses for persons working in technical fields who can use computers in their work include:

"Using Minicomputers," Dr. Udo W. Pooch; "Beginning PL/I," Dr. James E. George; and "Beginning Fortran," Dr. James N. Haag.

Courses for computer professionals include:

"Compiler Construction," Dr. Franklin L. DeRemer; "Operating Systems," Dr. Dennis Tschrititz; "Computer Architecture," Dr. William M. McKeeman; and "Discrete Systems Simulation Using GPSS," Dr. Thomas J. Schriber.

More information can be obtained from Don Humel, University of California Extension, UCSC, 95060.

Universities, on the other hand, do a fine job in the theoretical aspects of computer science and are vital to the growth of new technology in this area. Historically, they have served as sources of scientific or systems programmers.

However, they have recently developed a new strength in the areas of beginner

## Education

and intermediate training for commercial DP. This is primarily a part-time, continuing education effort with working DP professionals as instructors.

Incidentally, the presence of large computer facilities (developed initially for the computer science area) gives the commercial classes access to modern hardware and software.

Lack of that access is the biggest single problem with the DP schools which arose to fill a real need for entry-level training at a time of enormous DP expansion.

Attempts to certify these schools have been under way for a while and, hopefully, the reputable ones will be encouraged to expand.

It is up to the DP community to certify curricula, computer availability, counseling and vocational guidance at such schools to protect the novice and insure the quality of the graduates it may wish to hire.

## Updating Vital

Once hired, the personnel need frequent technological updating, and this is an area where professional societies have done an excellent job. Most run seminar programs or conferences of a high level of sophistication which provide very realistic and up-to-date information. An occasional poor presentation mars the picture, but sponsor policing seminars has kept that to a minimum.

Seminars offered by private concerns fall short of this record. Although there are some excellent firms with high quality programs, there is enough variation in quality to make the average DP person

wary.

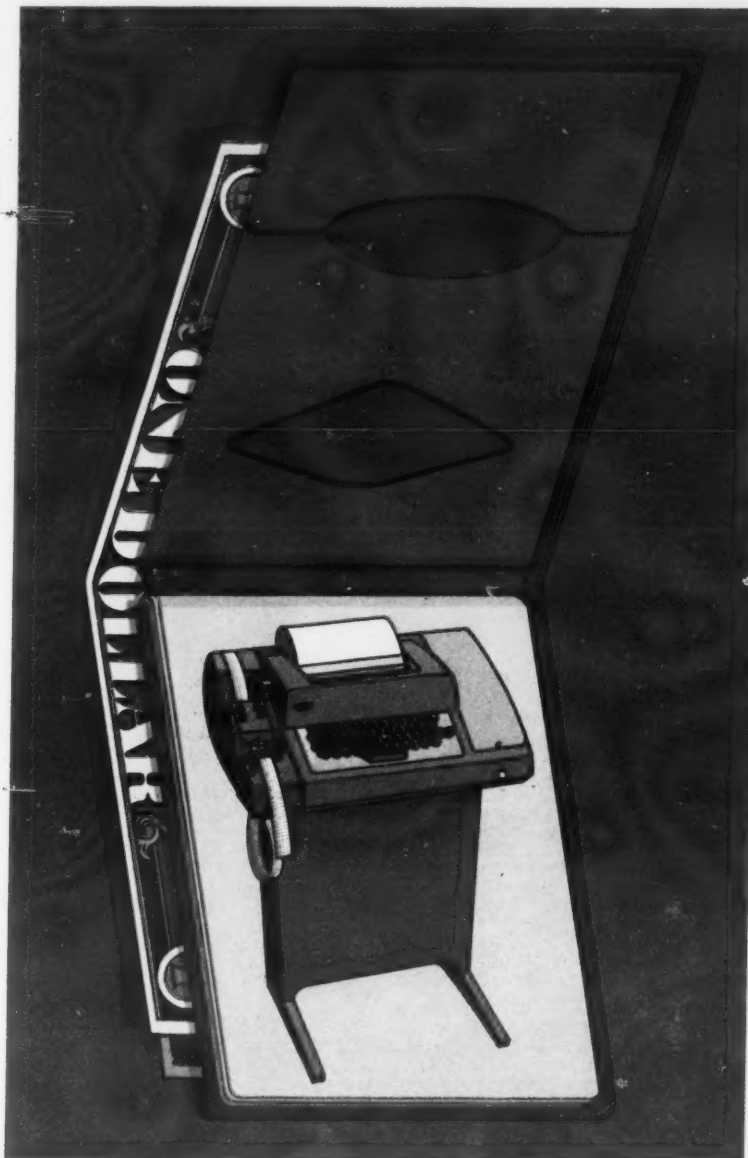
Again, as with the DP schools, we have an area which is amenable to certification or, at the very minimum, an approved list of those firms whose offerings were deemed of good quality. This is an area where users within an industry or of a product group might well consider an informal exchange of program reviews.

Faced with the variety of education sources, some firms have added their own training as a better way to achieve educational goals. Fortunate, indeed, is the employee whose firm gives him valuable education via an in-house department.

But for those of us who actively seek education outside our companies — and we probably are the majority — the marketplace is full — although not always with the exact price/quality mix we might want. But some cautious shopping can produce excellent results.

Smyth is in the management controls and information technology group at Kennecott Copper Corp. and an instructor at New York University.

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## CI Notes

### GSA Switches to Four-Phase

WASHINGTON, D.C. — The General Services Administration said it has awarded a \$4 million contract for key-to-disk systems to the second lowest bidder, Four-Phase System, Inc.

Inforex, the original recipient of the award, has appealed the GSA's ruling that its equipment failed to pass a benchmark test, a spokesman said.

The equipment will be used by the Social Security Administration.

### Memorex Suits Class Actions

CW West Coast Bureau

SAN FRANCISCO — Memorex stockholders who filed eight different suits against the company can sue as a class, a federal district judge here has ruled.

The suits, filed in 1971, charged Memorex with "alleged manipulation of the securities markets" and violations of securities laws, according to David B. Gold, attorney for the stockholders.

Memorex declined comment on the ruling.

The suits were filed following litigation against Memorex in June 1971 by the Securities and Exchange Commission regarding alleged misleading earnings reports.

### AF Awards Burroughs

DETROIT — Burroughs Federal and Special Systems Group has received a \$16 million contract from the Air Force Systems Command's Electronic Systems Division to furnish and install automatic data processing equipment at the AF Military Personnel Center, Randolph AFB, Texas.

Under the contract, a three-processor Burroughs B 6700 System will support the Advanced Personnel Data System (APDS). The new system will replace two Burroughs B 5500 systems and a Honeywell 1250 system.

### Supershorts

Computer Automation, Inc., has reported shipment of more than \$10 million worth of computers during the first 11 months of fiscal 1973, more than doubling total shipments for fiscal 1972.

Nixdorf Computer, Inc. plans to open seven new branch offices before the end of the year. The new offices are scheduled for Cincinnati, Dallas, Miami, Minneapolis, New Haven, St. Louis and San Diego.

## For California DP Center

# Univac Claims IBM Bias in State Bids

By Marvin Smalheiser  
CW West Coast Bureau

SACRAMENTO, Calif. — Univac has filed a protest accusing this state of favoring IBM in seeking bids for a \$40 million consolidated computer center.

The protest has launched an investigation of the charges which could eventually end up in the courts.

The complaints were contained in a letter from R. Malcolm Hill, manager of Univac's Sacramento office, to G. Lee Smith, the state DP officer.

In the meantime, the state is going ahead with procedures with the three companies which have indicated they will

submit bids — Control Data (CDC), Honeywell and IBM.

Univac's protest listed nine major points of complaint. Six alleged that the project specifications were written to favor IBM.

### IBM Involved

The first major allegation charged that much of the new bid prospectus — composed of 11,000 pages — was prepared by IBM.

Kent H. Gould, chief of EDP control and development for the state, denied the charges, saying over 80 state employees worked over a year on the procurement proposal for the Stephen P. Teale Center.

"We are beginning to process the protest. There is nothing in there we did not anticipate. We feel we can handle it. There doesn't seem to be any real legal basis for their protest," Gould said.

The protest followed the state's renewed efforts to get bids after having thrown out bids earlier this year when the two remaining bidders — IBM and Univac — were disqualified.

Hill told *Computerworld* the most serious complaint involved the arbitrary requirement of a decimal system, which was waived in previous invitations for bids (IFB).

He said the IFB asked that all data be stored in decimal format and not in binary, which he said was a direct violation of the state's administrative manual.

"It is our contention," Hill said, "the internal characters of the computer don't make any difference. So long as the input or output are equally useful, it makes no difference which computer system or architecture is used to reach a desired result."

Gould told CW the proposal does not require a decimal system.

Hill, in his protest letter, said:

"The restrictive nature of the invitation for bid prevents truly competitive bidding as required by the budget act by narrowly circumscribing the method of obtaining the ultimate goals of consolidation."

## U.S. DP Firms Trading Abroad Face Mixed Prospects: Commerce

By a CW Staff Writer

NEW YORK — There is both good news and bad news for U.S. computer industry companies which wish to do business abroad in the coming decade, according to Forest Abbuhl, director of the Office of International Trade Policy in the Department of Commerce.

U.S. firms presently hold 90% of the world computer market and between now and 1980 there should be an 11% increase in shipments from U.S. companies to the world markets, he said at a recent meeting.

But at the same time, U.S. firms are going to be facing more and more competition from the computer industries of other countries over the next few years, he observed.

Abbuhl noted that in Europe there will be more work done on a joint line of computer equipment, and he warned the new line might be incompatible with the equipment produced here.

The U.S. manufacturers can expect to see more consolidation in Europe over the next few years, he indicated, and in addition can expect to see increased governmental support for native computer companies and for the native industry as a whole.

The situation for U.S. firms trading in Japan is bad now, he said, but the outlook is even worse for the future.

The Japanese Government will apparently continue to follow its policy of protecting its native computer industry through a combined program of restricting imports and direct monetary subsidies to the firms in the business, he said.

He noted the Japanese apparently don't

lower the import restrictions in a marketplace until they are sure their native industry will be able to meet the competition from the foreigners — and that by then it is almost too late for any foreign company to compete successfully.

The Eastern European market could be a good one for U.S. firms, he said, but he noted the countries in this area also do not want their computer industry and computer use dominated by U.S. firms so that the industry would die down after some initial success.

## CIA Outlines Successes, Goals

NEW YORK — The Computer Industry Association has been successful in meeting most of its early goals, including preventing a "soft" pretrial settlement of the government's antitrust suit to break up IBM, according to Jack Biddle, executive director.

The group's six-point program for the coming year will stress continued discussion with members of Congress, the Justice Department and industry leaders about the best solutions for "overconcentration" in the DP industry, he added.

"We obtained public disclosure of IBM internal documents filed in the Telex antitrust suit against IBM. And by ensuring there was no soft pretrial settlement of the government's suit, we have made it much more likely that underlying, persistent problems of the data processing industry will be solved."

Biddle said the association's program for the current year will include:

- "Public discussion of solutions to over-

concentration, including a conference on industrial concentration in today's economy.

- "Continued meetings with the government including participation in the second round of hearings being conducted by U.S. Sen. Philip A. Hart (D-Mich.) on overconcentration.

- "Increasing the public's awareness of the importance to the consumer of free competition in business.

- "Involvement of users of computer systems in discussions of the problems and in pressing for a solution.

- "Maintaining a close relationship with the Justice Department to ensure a speedy, sound and long-range solution to the industry's problems.

- "Discussion with the financial community to demonstrate that an end to the 'overconcentration problem' of the data processing industry will allow all participants to grow and prosper."

## Efficiency's the word in Computerworld's July 25th

### Software

### Supplement

Software makes hardware happen.



As operating systems get more complex, efficient use of hardware gets more difficult. So a variety of new software tools have been developed to aid users in making their systems more efficient. DP evaluation programs analyze equipment utilization; simulation packages show how hardware will function before it's installed; hardware monitors check whether individual pieces of equipment are functioning according to specifications; and optimizers help make process coding more efficient.

These are some of the products we'll be looking at in our July 25th Software Supplement, edited by *Computerworld's* software specialist, Don Leavitt. Much of the information will be based on the experiences of companies who have used these products. And our research has shown that they can be quite effective. For example, one user we've talked to reported a 33% decrease in running time on a package of 13 programs after they implemented a computerized efficiency analysis.

Greater efficiency for your EDP system. That's what you'll be learning more about in our July 25th Software Supplement. If you're a user, it'll be well worth the reading. And if you're marketing in this area, it'll be well worth the advertising. Closing is July 6th. Don't miss it.

For more information, contact the nearest *Computerworld* Representative.

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## Distributorship Eases Move

# Inforex Penetrates Japanese Market With Aplomb

By Ken Shonk  
of the CW Staff

BURLINGTON, Mass. — Inforex has penetrated the Japanese market for data entry equipment through a Japanese distributor, the trading company of C. Itoh & Co., Ltd., rather than follow a licensing or joint subsidiary arrangement.

A spokesman for the New York offices of C. Itoh, Sadao Iida, said his personal estimate of Inforex's share of the Japanese market is over 50%.

The success of distributorships in Europe, the possibility of a small company getting lost because of the nature of the Japanese market, the ability of the trading company selected as the distributor to handle export/import and shipping, and the lack of resources to go into the Japanese market — except on someone else's coattails — all led Inforex to the distributorship arrangement, according to company officials.

From Inforex's viewpoint, the distribu-

torship arrangement simplifies the problems of entering and dealing with the Japanese market. Inforex simply ships orders directly to C. Itoh & Co., New York, and the distributor handles everything from that point on, from market evaluation and strategy to sales and service.

### Complicated Area

"Additionally, since all computer business in Japan is regulated by the Ministry of Trade and Industry (Miti)," noted John Mahoney, marketing services manager, "you just don't form joint ventures or create licensing agreements without the government becoming involved. You can, however, go into distributorship arrangements very easily."

Inforex's agreement covers the 1300 Series data entry equipment and specifies minimum takes, commitments to dollar value of sales, and commitments to a dedicated sales and service force. Inforex

in turn provides total support for training, software and system modifications for the Japanese market, and service. The terms of the agreement also allow renegotiations.

"You have to play along with the rules of the Japanese marketplace," Mahoney said, explaining why Inforex turned to a distributorship arrangement with one of the large trading companies.

"Trading companies are just characteristic of Japan. They represent all Japanese manufacturers overseas and nearly all overseas manufacturers in Japan and the larger companies own their own banks, steel mills and shipyards.

The primary consideration in Inforex's selection of a distributor, stated Stephen Wallis, financial planning manager, was "our desire for a company that would set up their own dedicated sales and service force for our products. We didn't want the Japanese distributor to put our prod-

ucts in electronics group number 8 together with equipment from other manufacturers," he said, noting that arrangement would also be an easy way to get lost.

"For any potential distributor to make the commitment for a dedicated sales and service force and make the market evaluation necessary, good financing is an absolute must," Konrad Kristensen, international desk manager, noted. "We don't ship a system anywhere in the world until service engineers are in the field, and we have shipped all the spare parts necessary.

"We also did our homework before we shipped any systems," Wallis related. "Since Japan uses the Katakana alphabet, we started from day one to ship systems with Katakana keyboards. No one else thought of that, so we had a Katakana available for the Japanese market a year before anyone else marketing shared-processor key stations."

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## Mira-Pak Files Antitrust Suit Against IBM

HOUSTON — IBM has been named in an antitrust suit by Mira-Pak, Inc., a maker of computer systems used by the food processing industry.

The suit, filed in the U.S. District Court for the Southern District of Texas, charged that IBM "through combinations and conspiracies with certain of Mira-Pak's competitors which manufacture manual processing machines," is seeking to "extend its monopoly to the package processing needs of certain segments of the food processing industry."

The suit also alleges that IBM is "misleading food processors to believe that its computer can control packaging machines to eliminate or greatly reduce product giveaway . . ."

Mira-Pak contends that sales of its Sigmatrol unit have been drastically decreased as the result of IBM's "anticompetitive and unfair practices which commenced in 1971."

An IBM spokesman said: "We believe the suit to be entirely without merit and we plan to defend ourselves vigorously in the courts."

Mira-Pak's Sigmatrol unit is an automatic weighing system with a built-in computer, and is marketed as a replacement for manual units.

IBM is marketing its System/7 as an interface to existing manual units, for about 15% under the cost of the Sigmatrol, Mira-Pak said.

In addition, Mira-Pak charged that IBM's intent was to gain a foothold in a customer's plant . . . as a means of eventually selling the customer on purchasing larger and more sophisticated IBM computers for interfacing with the System/7, with the eventual goal of providing a closed-loop computerized information and process control system."

IBM and Mira-Pak worked together between November 1971 and February 1972, as IBM had reportedly approached Mira-Pak about the possibility of a joint venture. During this time, Mira-Pak "furnished a large amount of marketing and technical data regarding Sigmatrol," Mira-Pak said.

## Vendors Confident No Major Market Slump Predicted

By Molly Upton  
Of the CW Staff

NEW YORK — Projections about the economy are generally optimistic, and although many data product vendors interviewed here recently were not anticipating a slowdown in the general economy before the end of the year, they all felt that with such a slowdown the effects on the DP industry would be delayed.

Mel Posin, assistant general manager for marketing, DP Division of Lockheed Electronics, described his view of the economy as "generally optimistic... There may be a little softness com-

ing, but not a major downturn as in 1970 and 1971," he said.

He noted there is some softness in consumer markets, and there generally is a six-month lag before affecting the industrial marketplace, he said. "Things are going too well" to have a recession on the scale of '70-'71.

Although Mike Buoncristiano, New Jersey account representative for Inforex, does not see any softening coming, he said if there were a slump, it would hit the DP industry later than the general economy. "I don't know of a slump that would hurt." He noted the data entry field is new enough to continue to attract business.

"Business is excellent," observed Ron Huch, vice-president of marketing for Centronics. Based on orders, he said he doesn't foresee a slump and he thought the DP industry would not feel the effect immediately.

George Abbott, eastern regional sales manager for Iomec, said he doesn't expect to see any sort of slump for the year. As a matter of fact, the industry is "still pulling out from under component supply problems caused by the last recession."



Buoncristiano



Posin



Abbott



Huch

CW Photos by M Upton

## Sorbus Diversifies

KING OF PRUSSIA, Pa. — Sorbus, a maintenance company with approximately 85% of its refurbishing business going to leasing companies and 15% to end users (not including work for Federal Government agencies, which is unpredictable), plans to accelerate its marketing programs into more various subscriber type markets while maintaining its present marketplace, according to Bob Leonard, director of marketing.

The three major categories Sorbus will cultivate include memory manufacturers, key-to-disk equipment manufacturers and the OEM market in general for minicomputers.

## Orders & Installations

Read's, Inc., a Baltimore drug store chain, has ordered 401 Model 902 electronic cash register terminals and 101 mini-cassette collection systems from the Singer Co. to provide up-to-date merchandising and inventory data.

Alpha/Beta Acme Supermarkets, Calif., is installing National Semiconductor Datachecker electronic checkout systems in 60 of its stores.

The Maryland State Colleges Information Center (MSCIC) has ordered a Univac 1106 system to serve seven colleges in the state. The central computer will handle a full range of business and administrative applications for each of the colleges.

Norwegian Caribbean Lines has ordered an NCR Century 101 computer and 10 NCR 795 CRTs as part of an on-line reservation system.

Delta Air Lines has ordered 48 PTS-100 programmable display terminals and two supporting controllers from Raytheon, to be used in conjunction with the airline's primary business computer.

The University of Nevada has installed a Control Data Corp. Cyber 70 Model 72 computer system to support the computing requirements of students, faculty and administration at campuses in Reno and Las Vegas, and the Desert Research Institute.

St. Petersburg Bank and Trust Co., Florida, has ordered an NCR Century 200 to serve as the nucleus of a Central Information File system.

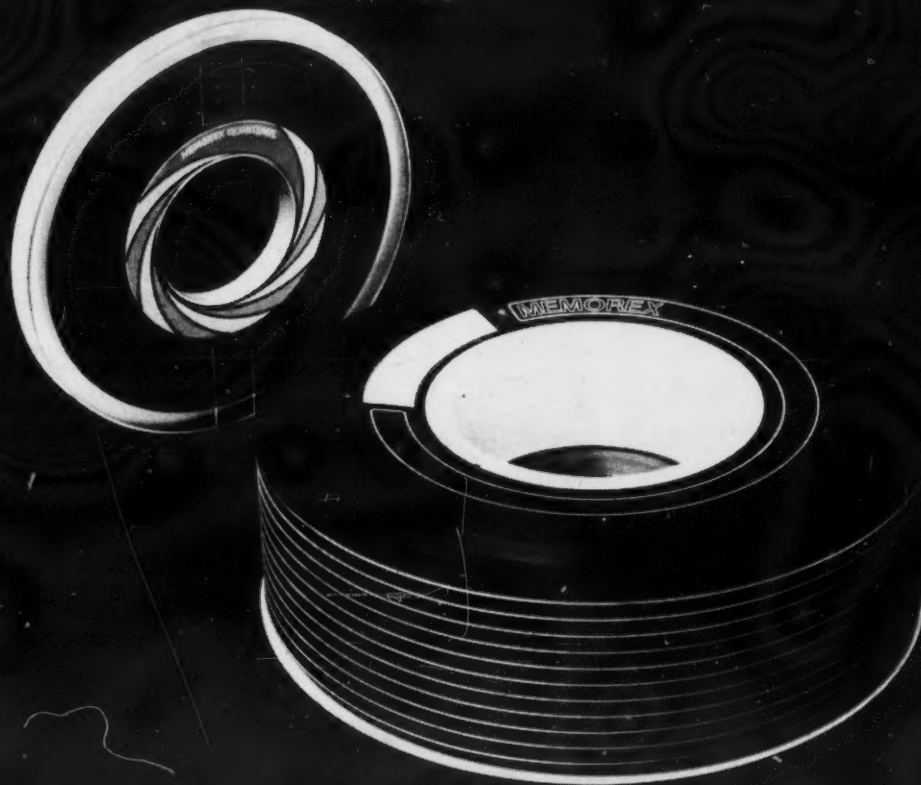
Avco Computer Services (ACS), Wilmington, Mass., has installed an Informatics Mark IV File Management System.

Nasa/Lewis Research Center, Cleveland, has purchased a Univac 1106 system, to handle business and scientific applications.

Naval Air Development Center, Warminster, Pa., has installed an AED-CDC 6000. The system, manufactured by Softech, Inc., will be used for support software for developmental programs.

Merrill-Lynch, New York, has ordered a Project Control/70 project management system from Atlantic Software Inc.

Base, Inc., a service bureau for General Motors dealerships, has ordered a Univac 9700 system, for use in inventory control, accounting and computerized storage planning.



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## IBM Backing Employees With Cash for Projects

ARMONK, N.Y. — "The initiative, creativity and business skills that corporation people develop in their jobs are a major community asset that should be tapped," IBM President and Board Chairman Frank Cary observed.

To encourage employees to participate in community affairs, IBM has set up a Fund for Community Service to help finance volunteer service in local communities.

The money can only be used by community service organizations in which

IBM employees are personally involved.

Since its initiation last fall, the fund has been used for 650 projects in 260 communities in 44 states and the District of Columbia.

Funds have been granted for equipment for projects such as a group that helps motorists in trouble, and camping gear for a Boy Scout troop comprised of mentally handicapped children.

Another project that received funding was a summer program for severely handicapped children.

Most of the grants range from \$100 to \$1,000, although there is no limit. IBM wants its money to go where it can make a real difference, not where it will merely displace regular contributions from other sources, the firm said.

To tap the fund, an employee submits a written request describing the community project and the sponsoring organization.

### CSC Merges Operations

CW West Coast Bureau

LOS ANGELES — Computer Sciences Corp. is moving its corporate headquarters from Century City to its El Segundo facilities to establish a closer working relationship with the company's Infonet and Commercial Divisions housed there.

## ...CDC Gives Jobs to City Dwellers

MINNEAPOLIS — Control Data Corp. plans to construct a new 15,000-sq-ft plant for its operations which provide part-time jobs for inner-city people in St. Paul.

"We plan to gradually hire 50 additional part-time employees from the surrounding area to add to our current part-time work force of 105 persons at our present Selby Avenue plant," said Norbert R. Berg, Control Data senior vice-president.

The plant is designed to meet the company's requirements for binding, mailing, stitching and collating technical literature.

The operation receives printed materials from various Control Data locations throughout the country, then assembles, covers and binds the materials to produce completed manuals and documents for shipment to customers.

The morning shift is made up mostly of female heads of households with children of elementary school age. In the afternoon, high school and college students from the Summit-University area work three hours each day, earning extra money for their schooling.

## Trendata Elects R. Pappas Chief

SUNNYVALE, Calif. — Robert Pappas, an Ampex executive for 17 years, is the new president of Trendata, a subsidiary of Applied Magnetics Corp. Pappas was most recently a group vice-president of Ampex and earlier had been vice-presi-

dent and general manager of the Military Products, Magnetic Tape and Instrumentation Divisions.

### Other Changes

■ Douglas K. Baker has been named chairman of the board and chief executive officer of Qantel Corp. Baker was formerly president of Basic/Four Corp. of Anaheim, Calif.

■ Raymond M. Alden has been named president and chief operating officer of United Telecommunications, Inc. Alden

### Executive Corner

has served as executive vice-president, operations, for the firm since 1964.

■ Neil G. Weisbeck has been appointed executive vice-president and general manager of Syncom Business Systems, Inc. of Cleveland. He will have total responsibility for the day-to-day operations of the firm.

■ Francis J. Gaudette has been named vice-president, finance, of Informatics, Inc. Systems and Services Co. Gaudette formerly served as vice-president, finance, of Computer Network Corp. of Washington, D.C.

■ William Valliant has been named vice-president, engineering, of PSC Technology, Inc.

■ Bert I. Helfinstein has been appointed president of International Reservations Corp., a Planning Research Co. Helfinstein will continue as president of Realtronics Computer Systems, Inc., also a Planning Research Co.

■ Mitchell E. Morris, formerly executive vice-president of Advanced Systems, Inc., has been named president of the firm.

■ Robert D. Kuster has been elected a vice-president of California Computer Products, Inc. He previously served as vice-president, finance, of Systems Associates, Inc.

■ J.C. Matlock has been named vice-president, marketing, for Data Processing Security, Inc. He has served as the head of DP operations for the Coca Cola Co. in Atlanta for the past eight years.

■ Gerald Sprayregen has assumed the titles and responsibilities left open by the resignation of John Gavin as president and chief operating officer of Technical Tape, Inc. Sprayregen is already chairman and chief executive officer.

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## ICL May Receive Increase in Loan

LONDON — International Computers Ltd. may receive a larger loan from the government this year than last, according to recent reports.

Although the Department of Trade and Industry has not divulged details yet, sources indicate the amount being considered is somewhere around \$63.7 million for research and development work on ICL's new range of computers.

Last July, the government said it would lend ICL \$36.2 million in an 18-month period that ends this September.



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Any reel of Quantum/L which is suspected of a defect in material or workmanship may be returned by the purchaser to Memorex and will be examined by Memorex. If, as determined by Memorex, the tape is defective in either material or workmanship and as a result of such defect is unsuitable for the use and service for which it was intended, the defective tape will be replaced with a new reel of Quantum/L.

Replacement will not be made for tapes damaged due to wear, improper handling, or malfunctioning equipment nor for tapes which have been damaged due to customer storage under environmental conditions beyond those limits described in the current specification sheet.

The liability of Memorex Corporation under this warranty is limited solely to replacing, repairing or issuing credit, at its discretion, for the products that are defective and in no event shall Memorex Corporation be liable for any other damages, including incidental and consequential damages. The warranty expressed herein is in lieu of all other warranties, express or implied, and no other affirmation of fact or promise made by Memorex by word or action shall constitute a warranty.

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## Action Finalizing Leasing Agreement

DALLAS — Action Communication Systems, Inc. and Manufacturers Hanover Leasing Corp., New York, are presently finalizing a \$5 million lease financing agreement for Action's communications processing systems, particularly the company's Telecontroller and Watsbox systems.

Action chairman T.J. Waggoner III said the leasing affiliate of Manufacturers Hanover Trust will, under the terms of the agreement, purchase the systems from the Dallas firm and lease them to companies recommended by Action.

Action will provide maintenance for customers, and has agreed to act as Manufacturers' remarketing agent for the systems.

### DOD Expenditure Estimated At \$13 Billion Through 1978

NEW YORK — The Department of Defense is expected to fund about \$13 billion through 1978 for military command, control and communications systems, according to a study by Frost & Sullivan.

The spending will peak in 1974, with the Air Force emerging as the largest segment, the report indicated.

The category includes DP, displays, communica-

tions sensors and systems engineering.

Reductions in military personnel are expected to stimulate the use of the systems, but "domestic political pressures on the federal budget should cause the market to level off," the study said.

### Westinghouse Reorganizes Its Computer Division

PITTSBURGH — Westinghouse Electric Corp. has announced an organizational realignment which includes its Computer and Instrumentation

### CI Wrapup

Division. The division will concentrate on signal- or information-oriented electronic equipment.

Included are the digital products department at Orlando, Fla., and the instrumentation department at Orrville, Ohio, and Phoenix, Ariz. Division headquarters will be at Orlando under the general management of G. Chris Turner.

### Basic Four Weathers Shakeup

IRVINE, Calif. — Basic Four, a unit of Management Assistance, Inc., has weathered a recent management shuffle which left it minus five executives.

Douglas K. Baker, president of Basic Four since the company was founded in June 1971, recently resigned. Quantel Corp., which competes with Basic Four in several market areas, has since announced the election of Baker as chairman of its board of directors and chief executive officer.

Al Cosentino, an MAI vice-president, has been named chief operations officer and chief executive for Basic Four.

John Keogh, vice-president/marketing; Bing K. O'Brien, top marketer; Glen Wright, controller; and Norman Rothstein, national systems manager have left the company.

### Fujitsu to Market in U.S.

Special to Computerworld

HONOLULU — Fujitsu Ltd., Japanese mini and peripheral maker, made its first U.S. appearance at IEEE's Region Six Conference here, demonstrating its Facom-Mate minicomputer system for software training systems.

Isamu Kobayashi, Fujitsu's Hawaii-based sales engineer, told *Computerworld* that the demonstration was in anticipation of marketing efforts in Hawaii.

Fujitsu, he said, already has three of its minis installed in its Honolulu management training center.

### Scottish DP \$ Estimated

WESTMINSTER, Scotland — The estimated total value of computer facilities installed in government departments and other public institutions in Scotland is "about \$41 million," according to a government spokesman.

The figures excludes local authorities, he said. About 18% of the \$41 million represents computers bought from companies with manufacturing facilities in Scotland.

Accurate figures for the last 10 years were not readily available, and the \$41 million was only an estimate, he said.

### Aussie Network Planned

Special to Computerworld

SYDNEY, Australia — Computer Sciences of Australia, on behalf of the Australian Mutual Provident Society (AMP), has placed an order with Digital Equipment Australia for a PDP-11/40 computer.

This order represents the initial step towards the installation of a computer network covering Australia and New Zealand. The network is designed to provide an optimum balance between remote and central processing.

### Hughes, Aussies Sign Contract

Special To Computerworld

CANBERRA, Australia — Hughes Aircraft Co. of Los Angeles has won a short-term consultant services contract to advise the Australian Post Office on how to establish a satellite communications system.

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Any Mark X/L Disc Pack which is suspected of a defect in workmanship or material may be returned by the purchaser to Memorex prepaid, properly identified and packaged. If upon inspection, Memorex determines that the pack failure was the result of a defect in material or workmanship, the Mark X/L will be repaired or replaced at no charge. If it is ascertained that the defect was the result of improper handling or storage, transportation in unauthorized shipping containers, malfunctioning disc drives, normal wear or other than a manufacturing responsibility, the defective pack will be repaired at a price governed by Memorex's current schedule of repair charges. The customer will be invoiced for such charges and the disc pack returned freight collect.

This warranty pertains only to the original buyer and is not transferable. When leased Mark X/L disc packs are subsequently purchased, the effective warranty period commences on the date the pack was shipped to the lessee.

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## Toward the Bottom Line...

### Keydata Shows Gain In Earnings, Revenue

WATERTOWN, Mass. — Keydata Corp. reported record earnings and revenues for the third quarter and nine months ended April 30.

Earnings for the quarter rose to \$227,000 or 8 cents a share including a \$106,000 special credit, compared with \$45,000 or 2 cents a share, with a \$19,000 special credit, in the year-ago period.

Revenues increased 31% to \$2.4 million from \$1.9 million in the same 1972 quarter.

For the nine months, earnings totaled \$604,000 or 21 cents a share compared with \$185,000 or 8 cents a share a year ago. Special costs were \$284,000 in the 1973 period and \$129,000 in the 1972 period.

Revenues climbed to \$6.9 million, up

28% from the \$5.4 million in the year-ago period.

The increase in Keydata services by large, multilocation companies contributed significantly to the improved nine-month results, according to President John T. Gilmore Jr.

"New customer contracts were up 52% in dollar value in the three quarters," he added.

### Comress Shows Loss

ROCKVILLE, Md. — Comress, Inc. earnings and revenues took a nosedive in the first quarter ended March 31, and President Joseph K. Wineke said it is probable the firm will continue to show a loss through the second quarter.

The loss for the quarter totaled \$277,600 or 4 cents a share compared with restated earnings of \$52,200 or 1 cent a share in the year ago period.

Revenues also declined, to \$1.1 million from \$1.5 million in the same 1972 quarter.

Wineke said corrective actions, including stringent cost control measures, were initiated late in the first quarter, and their full effects have not yet been realized.

### Graham 6 Month Earnings Up

GRAHAM, Texas — With help from a strong first quarter, Graham Magnetics Corp.'s six-month earnings exceeded those of the corresponding year-ago period despite the lack of tax credits during the current year.

Earnings for the six months ended March 31 rose to \$680,091 or 73 cents a share compared with \$661,348 or 82 cents a share a year ago, when a tax credit of \$190,000 was included.

Revenues rose to \$8.3 million from \$6.9 million.

### Applied Logic Revenues Rise

PRINCETON, N.J. — Applied Logic reported improved earnings and revenues for the six months ended March 31, with earnings reaching \$100,683 or 5 cents a share compared with a loss of \$320,809

or 19 cents a share a year ago.

Revenues rose 38% to \$1.7 million in the same period last year.

Several factors cited as contributing to the improved performance were: an extension to a Navy contract; continued growth in revenues from the financial business segment; new contracts for Basis; and a contract with Nasa for one of the firm's time-sharing systems.

### Scan-Data Has Profitable Quarter

NORRISTOWN, Pa. — Scan-Data Corp. showed progress in the first quarter ended March 31, with earnings of \$1,849 compared with a restated loss of \$315,196 or 27 cents a share for the same period last year.

Revenues during the quarter rose to \$1.6 million from \$1.2 million a year ago.

The 1972 loss was restated to reflect a change in accounting for previously deferred marketing and installation expenses. The loss as originally stated was \$56,196 or 5 cents a share.

### Further Down

Computer Transmission Corp. (Tran) of El Segundo, Calif., has secured financing amounting to \$1.75 million through a private stock placement arranged by New Court Securities Corp. of New York.

Mangement Data Corp. has changed its name to MDC Corp.

Pitney Bowes-Alpex, Inc., the company owned equally by Pitney-Bowes, Inc. and Alpex Computer Corp., has signed an \$8 million two-year credit agreement with Chemical Bank and The State National Bank of Connecticut.

The operations of Computility, a subsidiary of Grumman Data Systems Corp., have produced an interim profit of \$57,432 for the first quarter of 1973. This compares with last year's first quarter operating loss of \$49,611, the firm said.

Planning Research Corp. has closed a \$13 million loan agreement with a group of banks led by Security Pacific National Bank. Other banks in the group are Morgan Guaranty Trust Co. of New York and First Western Bank and Trust Co.

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San Francisco Area: Bill Healey, Thompson/Healey Assoc. 1111 Hearst Bldg., San Francisco, Calif. 94103. Tel: (415) 362-8547.

Japan: Mr. Yoshi Yamamoto, Nippon Keisoku Inc., P.O. Box 410, Central Tokyo, Japan.

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## And DLC Revaluates 360s

## Rockwood Loses \$32.9 Million in Year

ELMSFORD, N.Y. — A \$41.7 million revaluation of its IBM 360 leasing portfolio resulted in a loss of \$32.9 million by Rockwood Computer Corp. for the year ended March 31.

The portfolio is to be carried at no more than 25% of original cost by Dec. 31, 1975, and is to be fully depreciated by Dec. 31, 1978, according to a policy made in February.

The firm also obtained \$25 million from a financial group headed by the Provident Bank of Cincinnati, Ohio, which was

used to pay off short-term debts to IBM and other short-term obligations.

Revenues declined slightly during the year to \$47.1 million from \$47.6 million a year ago.

A tax benefit of \$7.6 million helped reduce the \$47.6 million charge. In 1972, the firm earned almost \$2 million or 57 cents a share.

DCL, Inc., holding company of Diebold Computer Leasing, Inc., also decided to write down its 360 equipment and expects this will result in a "material charge"

to 1972 income.

The firm said its 360 equipment originally cost about \$167 million and has a book value of about \$107 million. DCL Inc. cited several actions by IBM as prompting the "continual erosion" of the rental rates, especially for tape and disk and control units.

The firm blamed IBM's recent announcements of maintenance price hikes on purchased equipment, virtual memory and the 370/125, which it said "threatens ultimately to impact the company's large installed 360/30 and 40 base."

## New Registrations

ADVANCED MEMORY SYSTEMS, INC., 1276 Hammerwood Ave., Sunnyvale Calif., has filed to register 124,510 shares of common, in exchange for the transfer of the assets of Computer Microtechnology, Inc. (CMI) to a wholly owned subsidiary of AMS. AMS shares will be distributed to Microtechnology shareholders at the rate of 1/35 AMS share for each CMI share.

FOUR-PHASE SYSTEMS, INC., 10420 North Tantau Ave., Cupertino, Calif., manufacturer of multi-terminal video-display computer systems, has filed to register 600,000 shares of common. Proceeds, at \$14 per share maximum, will be used to repay bank loans and to finance the cost of equipment for leasing. The underwriter is Blyth Eastman Dillon & Co., 1 Chase Manhattan Plaza, N.Y., 10005.

MONOLITHIC MEMORIES, INC., 1165 East Arques Ave., Sunnyvale, Calif., has filed to register 630,000 shares of common, of which 520,000 are to be offered for sale by the company and 110,000 by a selling stockholder. Proceeds, at \$16 per share maximum, will be used for working capital. The underwriter is Loeb, Rhoades & Co., 42 Wall St., New York, 10005.

## Earnings Reports

ELECTRONIC ASSISTANCE  
Three Months Ended April 30

	1973	1972
Revenue	\$8,984,000	\$9,035,000
Loss	137,000	360,000

DATA PRODUCTS  
Year Ended March 31

	1973	1972
Shr Ernd	\$.34	\$.10
Revenue	59,789,000	50,889,000
Disc Op	.....	(134,000)
aSpec Cred	815,000	405,000
Earnings	2,275,000	703,000

a-In 1973, tax credit; in 1972, tax-loss carryforward plus capital gains.

BOLT BERANEK AND NEWMAN  
Three Months Ended March 31

	1973	1972
Shr Ernd	\$.30	\$.17
Revenue	5,770,400	4,639,400
Spec Item	123,300	.....
Earnings	383,100	206,800
9 Mo Shr	.70	.47
Revenue	16,285,000	13,764,500
Spec Item	142,800	.....
Earnings	885,500	567,600

SYSTEM DEVELOPMENT  
Three Months Ended March 23

	1973	1972
Shr Ernd	\$.20	\$.17
Revenue	17,359,000	12,802,000
Earnings	382,000	283,000
9 Mo Shr	.58	.51
Tax Cred	.....	203,000
Earnings	1,905,000	a1,676,000

a-Restated to reflect one-for-two stock split in October 1972.

TECHNALYSIS  
Three Months Ended March 31

	1973	1972
Shr Ernd	\$.04	\$.03
Revenue	340,912	296,001
Earnings	25,000	15,350

MICROMEX  
Year Ended March 31

	1973	1972
Shr Ernd	\$.14	\$.02
Revenue	454,665	309,685
Earnings	79,635	7,082

COMPUTER COMMUNICATIONS  
Three Months Ended March 31

	1973	a1972
Shr Ernd	.....	\$.02
Revenue	\$1,327,242	1,904,984
Disc Op	.....	(94,864)
Spec Chg	b68,000	.....
Earnings	(133,723)	15,219
9 Mo Shr	.01	.....
Revenue	4,516,355	4,894,924
Disc Op	(29,417)	(498,751)
Spec Item	d4,000	c118,660
Earnings	9,260	(901,479)

a-Restated. b-Reduction of tax-loss carryforward credit. c-Credit; gain on sale of subsidiary. d-Charge; loss on sale of subsidiary less tax-loss carryforward credit.

ULTIMACC SYSTEMS  
Three Months Ended March 31

	1973	1972
Shr Ernd	\$.04	.....
Revenue	606,667	\$170,063
Tax Cred	7,738	.....
Earnings	19,506	(85,516)

KEYDATA  
Three Months Ended April 30

	1973	1972
Shr Ernd	\$.08	\$.02
Revenue	2,423,000	1,850,000
Tax Cred	106,000	19,000
Earnings	227,000	45,000
9 Mo Shr	.21	.08
Revenue	6,866,000	5,362,000
aSpec Cred	284,000	129,000
Earnings	604,000	185,000

a-In 1973, tax credit; in 1972 tax credit plus gain on sale of publications operations.

CORDURA  
Three Months Ended April 30

	1973	a1972
Shr Ernd	\$.30	\$.30
bRevenue	33,084,000	26,924,000
Disc Op	(43,000)	(37,000)
Spec Chg	490,000	.....
Earnings	1,883,000	1,900,000
6 Mo Shr	.60	.56
bRevenue	59,129,000	49,401,000
Disc Op	(95,000)	(114,000)
Spec Chg	490,000	.....
Earnings	3,702,000	3,595,000

a-Restated. b-From continuing operations. c-Loss on sale of direct mail operations of a subsidiary.

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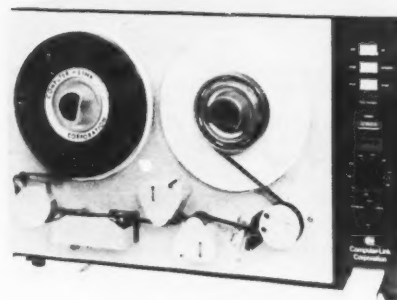
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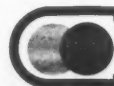
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# Computerworld Stock Trading Summary

All statistics  
compiled, computed  
and formatted by  
TRADE QUOTES, INC.  
Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, JUNE 21, 1973

E X C H	1973 RANGE (1)	CLOSE JUN 21 1973	WEEK NET CHNGE	WEEK PCT CHNGE
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## SOFTWARE &amp; EDP SERVICES

O ADVANCED COMP TECH	1- 2	1	0	0.0
A APPLIED DATA RES.	2- 4	1 7/8	- 1/8	-6.2
O APPLIED LOGIC	1- 3	1 1/4	- 1/4	-16.6
N AUTOMATIC DATA PHOC	49- 94	49 1/8	-6 1/8	-11.0
O BRANDON APPLIED SYST	1- 1	1/2	0	0.0
O COMPUTER DIMENSIONS	2- 5	3 1/4	- 1/4	-7.1
O COMPUTER DYNAMICS	1- 2	5/8	0	0.0
O COMPUTER NETWORK	1- 5	1 1/2	0	0.0
N COMPUTER SCIENCES	2- 6	2 1/2	- 1/4	-9.0
O COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
O COMPUTER TECHNOLOGY	1- 3	1	0	0.0
O COMPUTER USAGE	4- 9	5 1/8	+ 1/8	+2.5
O COMRESS	1- 2	1/4	0	0.0
O COMSHARE	4- 9	4 1/2	0	0.0

N CORDURA CORP	5- 15	5 1/4	- 3/8	-6.6
O DATATAB	2- 4	2	0	0.0
O EDP RESOURCES	1- 3	1 1/4	+ 1/4	+25.0
A ELECT COMP PROG	1- 2	1 1/4	+ 1/8	+11.1
N ELECTRONIC DATA SYS.	30- 56	30 1/8	-2 5/8	-8.0
O INFORMATICS	2- 6	3 3/4	0	0.0
O I.O.A. DATA CORP	1- 1	3/4	+ 1/8	+20.0

O KEANE ASSOCIATES	3- 4	3	0	0.0
O KEYDATA CORP	7- 12	6 1/4	- 1/4	-3.8
O LOGICON	4- 7	3 1/2	- 1/8	-3.4
A MANAGEMENT DATA	2- 5	1 7/8	- 1/8	-6.2
O NATIONAL CSS INC	8- 41	20 1/2	- 1/4	-1.2
O NATIONAL INFO SVCS	1- 2	7/8	- 1/8	-12.5
P ON LINE SYSTEMS INC	13- 17	12 1/2	- 3/8	-2.9

N PLANNING RESEARCH	2- 7	2 1/4	- 3/8	-14.2
O PROGRAMMING METHODS	21- 24	21	0	0.0
O PROGRAMMING & SYS	1- 1	3/4	0	0.0
O RAPIDATA INC	6- 24	5 3/4	- 1/2	-8.0
O SCIENTIFIC COMPUTERS	1- 2	7/8	- 1/8	-12.5
O SIMPLICITY COMPUTER	2- 4	2 5/8	- 1/4	-8.6
O THS COMPUTER CENTERS	3- 4	2 1/2	0	0.0

O TCC INC	1- 1	1/2	0	0.0
O TYMSHARE INC	6- 12	7 5/8	+ 1/2	+7.0
O UNITED DATA CENTER	5- 6	4	0	0.0
N UNIVERSITY COMPUTING	5- 11	5	- 3/8	-6.9
A UHS SYSTEMS	4- 8	4	- 1/4	-5.8

## PERIPHERALS &amp; SUBSYSTEMS

N ADDRESSOGRAPH-MULT	12- 34	12 7/8	- 1/8	-0.9
O ADVANCED MEMORY SYS	5- 23	5 3/4	- 1/4	-4.1
N AMPEX CORP	4- 7	4 3/4	0	0.0
O ANDERSON JACOBSON	3- 6	3	- 1/4	-7.6
O BEEHIVE MEDICAL ELEC	6- 10	6	- 1/4	-14.2
A BOLT-BERANEK & NEW	6- 12	6 5/8	+ 1/8	+1.9
N BUNKER-RAND	6- 18	9 5/8	- 1/2	-4.9

A CALCOMP	5- 13	7 3/8	+ 1/8	+1.7
O CAMBRIDGE MEMORIES	10- 15	8 7/8	- 3/8	-4.0
O CENTRONICS DATA COMP	13- 28	17	- 1	-5.5
O CODEX CORP	9- 19	10 1/2	- 1/2	-4.5
O COGNITRONICS	1- 3	1 5/8	0	0.0
O COMPUTER COMMUN.	1- 4	1 3/8	- 1/8	-8.3
A COMPUTER EQUIPMENT	2- 3	2 1/8	- 1/8	-5.5

O COMPUTER MACHINERY	5- 13	5 1/4	- 1/4	-19.2
O COMPUTER TRANSCIEVER	2- 6	1 1/2	- 3/8	-20.0
N CONRAC CORP	15- 32	16 3/4	+ 3/4	+4.6
A DATA PRODUCTS CORP	2- 4	2 3/4	- 1/8	-4.3
O DATA RECOGNITION	2- 3	1 1/2	0	0.0
O DATA TECHNOLOGY	2- 5	2 3/8	- 1/4	-9.5
O DI/AN CONTROLS	2- 4	2 1/8	0	0.0

N ELECTRONIC M & M	3- 6	3	- 3/8	-11.1
O FABRI-TEK	2- 5	2 1/4	- 3/8	-14.2
O GENERAL COMPUTER SYS	6- 9	6	0	0.0
N GENERAL ELECTRIC	56- 76	57 1/8	- 1 3/4	-2.9
N HAZELTINE CORP	5- 9	5 3/4	- 1/4	-4.1
O INFOMEX INC	7- 23	7 1/4	- 3/8	-4.9
O INFORMATION DISPLAYS	1- 2	3/4	0	0.0

O INFORMATION INTL INC	10- 15	9 1/2	- 1/4	-2.5
A LUNDY ELECTRONICS	4- 9	4 1/8	- 1/8	-2.9
O MANAGEMENT ASSIST	1- 1	1/4	0	0.0
A MILGO ELECTRONICS	14- 28	14 1/4	- 3/4	-5.0
N MOHAWK DATA SCI	4- 13	3 7/8	- 1 1/8	-22.5
O ODEC COMPUTER SYST.	2- 6	2 1/4	0	0.0
O OPTICAL SCANNING	2- 7	3	0	0.0

O PERTEC CORP	5- 8	5 1/8	- 1/4	-4.6
O PHOTON	3- 7	3 3/4	0	0.0
A POTTER INSTRUMENT	4- 9	3 1/2	- 1/2	-12.5
O PRECISION INST.	2- 6	2 3/4	- 1/4	-8.3
O RECOGNITION EQUIP	4- 8	4	- 3/8	-8.5
N SANDERS ASSOCIATES	7- 18	7 3/8	- 5/8	-7.8
O SCAN DATA	1- 6	1 3/8	- 1/8	-8.3

O STORAGE TECHNOLOGY	12- 34	12 1/4	- 1	-7.5
O SYCOR INC	9- 14	10 1/4	- 1	-8.8
O TALLY CORP.	2- 14	3 1/4	- 1/2	-13.3
N TETRONIX INC	30- 53	31 1/8	-2 3/8	-7.0
N TELEX	3- 6	3 7/8	- 1/8	-3.1
O WILTEK INC	10- 18	9 1/2	- 1	-9.5

## SUPPLIES &amp; ACCESSORIES

O BALTIMORE BUS FORMS	5- 9	6	- 1/4	-4.0
A BARRY WRIGHT	6- 13	6 5/8	- 3/4	-10.1
A DATA DOCUMENTS	17- 22	17	0	0.0
O DUPLEX PRODUCTS INC	7- 10	8	- 1/4	-3.0
N ENNIS BUS. FORMS	5- 8	5 1/4	+ 1/8	+2.4
O GRAHAM MAGNETICS	10- 20	10 1/4	0	0.0
O GRAPHIC CONTROLS	6- 12	8 3/8	- 1/2	-5.6

E X C H	1973 RANGE (1)	CLOSE JUN 21 1973	WEEK NET CHNGE	WEEK PCT CHNGE
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N 3M COMPANY	78- 89	82	- 1 3/4	-2.0
O MOORE CORP LTD	53- 60	53 1/4	- 1 3/4	-3.1
N NASHUA CORP	42- 58	48	+ 3/4	+1.5
O REYNOLDS & REYNOLD	40- 51	40 3/4	- 3/8	-0.9
O STANDARD REGISTER	14- 20	14 3/4	0	0.0
O TAB PRODUCTS CO	10- 23	9 1/2	- 1	-9.5

N UARCO	17- 23	17 5/8	- 3/4	-4.0
A WABASH MAGNETICS	5- 7	5 1/4	+ 1/8	+2.4
N WALLACE HUS FORMS	16- 26	16 3/8	- 3/4	-4.3

## COMPUTER SYSTEMS

N HUKROUGHS CORP	211-245	222	-6	-2.6
N COLLINS RADIO	16- 26	16	- 1 1/8	-6.5
N CONTROL DATA CORP	35- 62	36	+ 3/4	+2.1
O DATA GENERAL CORP	28- 46	31 1/4	- 1	-3.1
O DIGITAL COMP CONTROL	2- 6	2 3/8	+ 1/4	+11.7
N DIGITAL EQUIPMENT	73-105	80 1/8	- 1 5/8	-1.9
N ELECTRONIC ASSOC.	4- 9	4 1/8	- 3/8	-8.3

A ELECTRONIC ENGINEER.	6- 11	7 3/4	- 1/4	-3.1
N FOXBORO	23- 32	26 1/8	-2 1/2	-8.7
O GENERAL AUTOMATION	22- 55	21 1/2	-5 1/2	-20.3
O GHI COMPUTER CORP	1- 3	1	0	0.0
N HEWLETT-PACKARD CO	74- 95	75 1/8	- 7/8	-1.1
N HONEYWELL INC	98-139	100 7/8	-2 1/2	-2.4
N IBM	307-340	315 1/2	-5 1/2	-1.7

O INTERDATA INC	7- 13	8 1/4	- 3/4	-8.3
N MEMOREX	2- 19	4 3/4	- 1/8	-2.5
O MICRODATA CORP	3- 10	2 3/8	- 1/2	-17.3
N NCR	27- 37	36	+ 5/8	+1.7
N RAYTHEON CO	24- 34	24	- 1 3/8	-5.4
N SPERRY RAND	36- 50	39 1/4	- 1/4	-0.6
A SYSTEMS ENG. LABS	3- 8	3 1/4	- 1/2	-13.3

N VARIAN ASSOCIATES	10- 20	10 1/8	- 1 3/8	-11.9
N WANG LABS.	13- 34	14 5/8	- 7/8	-5.6
N XEROX CORP	141-169	152 7/8	-2 3/4	-1.7

## LEASING COMPANIES

A BOOTHE COMPUTER	1- 5	1 5/8	+ 3/8	+30.0
O BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O COMDISCO INC	6- 17	6 3/8	- 1/8	-1.9
O COMMERCE GROUP CORP	3- 4	3 3/4	+ 3/8	+11.1
O COMPUTER EXCHANGE	1- 1	1/2	0	0.0
A COMPUTER INVSTRS GRP	2- 8	2 1/2	- 1/2	-16.6
O COMP. INSTALLATIONS	1- 2	1	0	0.0

N DPF INC	5- 9	7 1/2	+ 1 1/8	+17.6
M DATRONIC RENTAL	2- 3	2 3/8	+ 1/4	+11.7
O DCL INC	2- 3	1 1/2	0	0.0
A DEARBORN-STORM	13- 26	12 1/2	- 1 3/4	-12.2
A DPA, INC.	5- 8	4 3/4	- 1/4	-5.0
A GHANITE MGT	2- 6	3 3/8	- 1/8	-3.5
A GREYHOUND COMPUTER	3- 6	3 1/2	- 1/4	-6.6

A ITEL	4- 12	5	- 1/2	-9.0
N LEASCO CORP	8- 18	8 3/8	- 1	-10.6
O LEASPCORP	2- 8	3 1/2	+ 1 3/8	+64.7
O LECTRO MGT INC	1- 2	1 1/4	0	0.0
O NRG INC	6- 15	7 3/8	- 1/8	-1.6
A ROCKWOOD COMPUTER	1- 3	1 1/8	- 1/8	-10.0
N U.S. LEASING	16- 36	19	0	0.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE

L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER

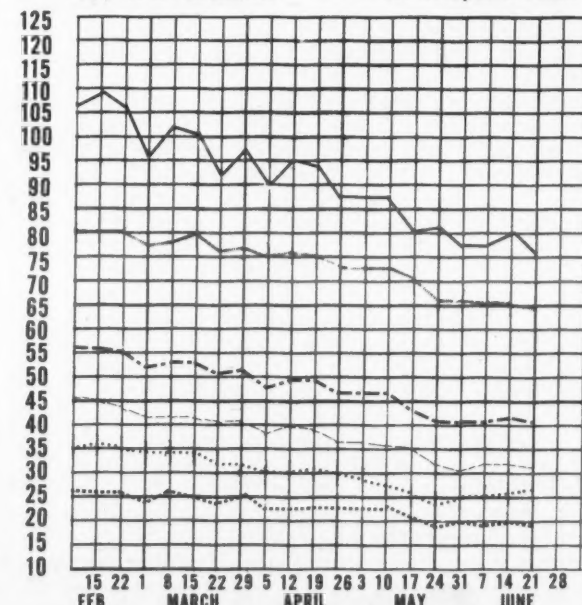
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(1) TO NEAREST DOLLAR

## COMPUTER STOCKS TRADING INDEX

— Computer Systems      - - - - Software & EDP Services  
 ..... Peripherals & Subsystems      ..... Leasing Companies  
 ..... Supplies & Accessories      - - - - CW Composite Index



## Earnings Reports

COMPUTER DESIGN			
Three Months Ended March 31			
	1973	1972	
Shr Ernd	\$ .04	\$ .09	
Revenue	5,714,102	4,314,288	
Earnings	67,696	124,948	

LOGIC			
Three Months Ended March 30			
	1973	1972	
Shr Ernd	.....	\$ .01	
Revenue	\$679,322	666,773	
Tax Cred	.....	13,200	
Earnings	(244,411)	21,293	

ITEL			
Three Months Ended March 31			
	1973	1972	
Shr Ernd	\$ .10	.....	
Revenue	33,325,000	\$19,444,000	
Spec Cred	254,000	.....	
Earnings	721,000	(1,527,000)	

LUNDY ELECTRONICS & SYSTEMS			
Nine Months Ended March 31			
	1973	1972	
Shr Ernd	\$ .30	\$ .33	
Revenue	13,303,718	12,601,574	
Earnings	260,265	283,687	

MSI DATA			
Year Ended March 31			
	1973	1972	
Shr Ernd	\$ .34	\$ .33	
Revenue	13,489,746	10,520,525	
Spec Item	d31,000	b92,000	
Earnings	602,351	472,721	

a-Adjusted for three-for-two stock split in May 1972. b-Tax-loss carry-forward credit. d-Debit; writedown of land held for sale.

CALIFORNIA COMPUTER PRODUCTS			
Three Months Ended April 1			
	1973	1972	
Shr Ernd	\$ .33	.....	
Revenue	21,340,000	\$11,506,000	
Earnings	976,000	(512,000)	
9 Mo Rev	54,811,000	36,974,000	
Loss	603,000	a5,741,000	

a-Restated to reflect accounting changes.

COMPUTER MACHINERY			
Three Months Ended March 31			
	1973	1972	
Shr Ernd	\$ .08	.....	
Revenue	10,685,050	\$3,184,822	
Tax Cred	276,000	.....	
Earnings	386,416	(1,276,776)	

DIGITAL EQUIPMENT			
Three Months Ended March 31			
	1973	1972	
Shr Ernd	\$ .56	\$ .36	
Revenue	67,395,000	47,737,000	
Earnings	6,151,000	3,652,000	
9 Mo Shr	1.31	1.00	
Revenue	179,168,000	131,085,000	
Earnings	14,179,000	10,240,000	

SPERRY RAND			
Year Ended March 31			
	1973		a1972
	(000)		(000)
Shr Ernd	\$2.62		\$1.77
Revenue	2,229,253		1,823,937
Earnings	90,057		60,780
3 Mo Shr	.85		.58
Revenue	635,015		549,791
Earnings	29,232		20,047



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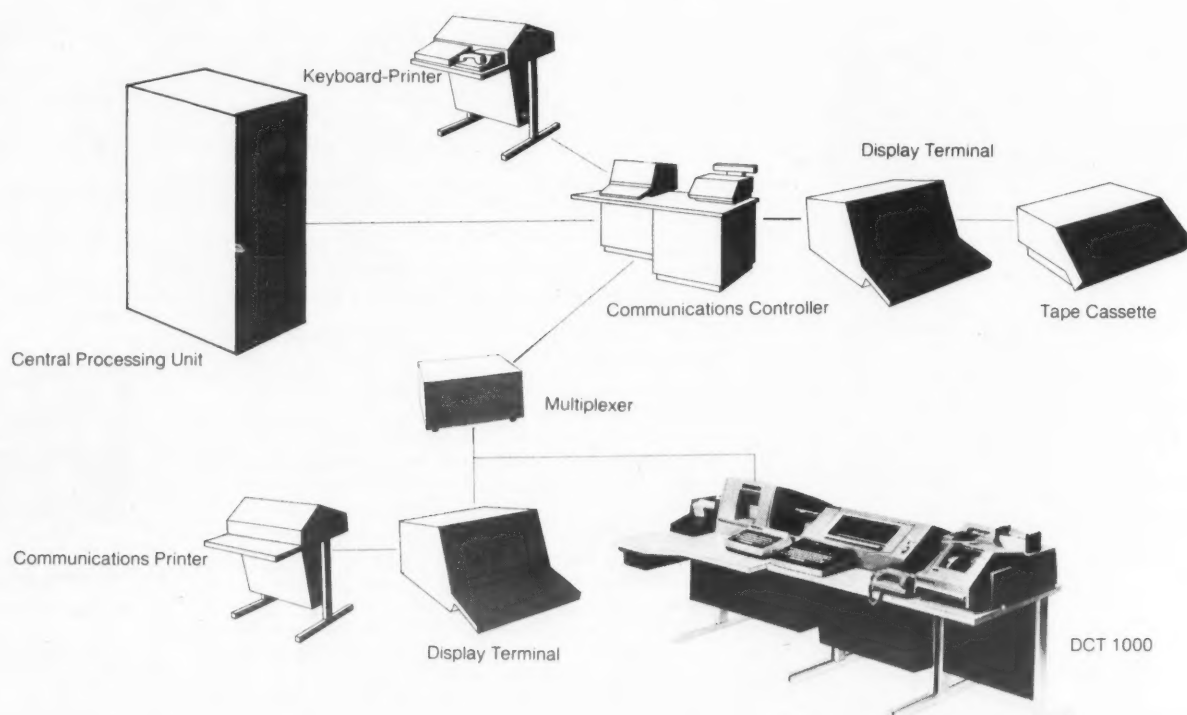
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